

DEC 1 1916
UNIVERSITY LIBRARIES
1916

Railway Age Gazette

SECOND HALF OF 1916—No. 22

SIXTY-FIRST YEAR

NEW YORK: Woolworth Building
CHICAGO: Transportation Building

NEW YORK—DECEMBER 1, 1916—CHICAGO

CLEVELAND: Citizens Building
WASHINGTON: Home Life Bldg.

How Many Car Wheels Do You Remove a Year?

On the average road the number often runs into thousands.
And how much does it cost for each wheel removal?

It costs the sum of the following:

Labor of removal and replacement—Cost of new brasses, less scrap value of old ones—Car earnings lost—Purchase of new wheels—Also in the case of wrought steel wheels—Cost of re-turning—Upkeep of shop equipment—Adjustment of coupler heights and brake levers.

Can you afford to pay this cost of removing thousands of car wheels?

Davis Steel Wheels will decrease your wheel maintenance cost.

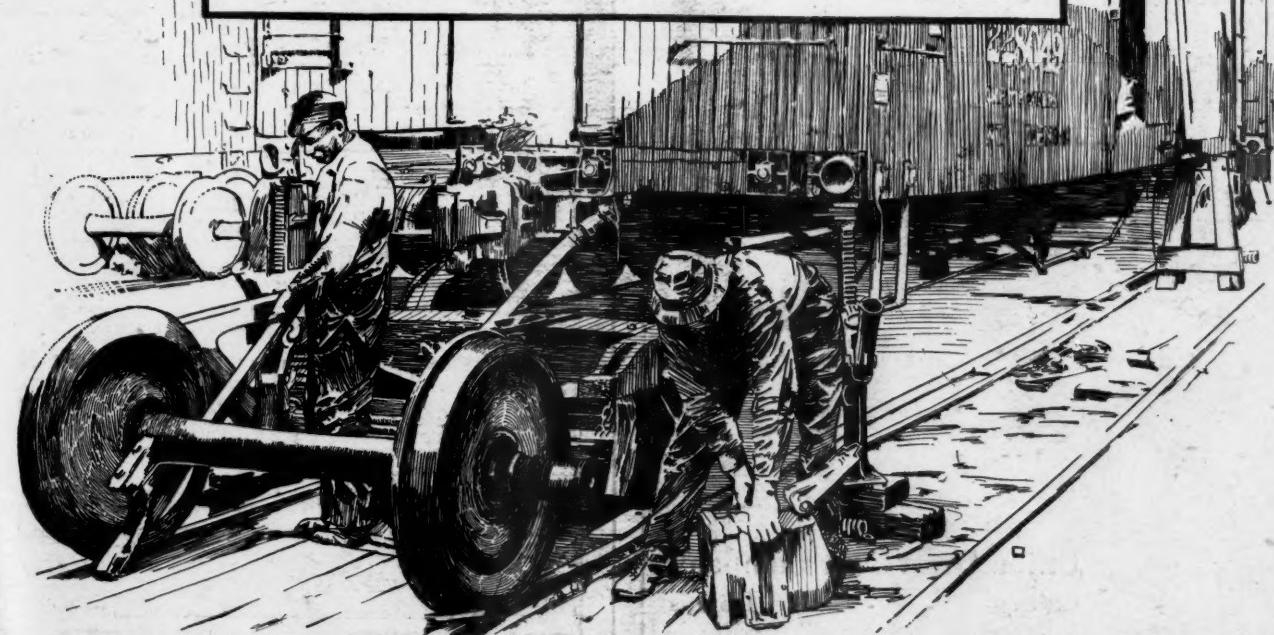
The manganese steel, one-wear tread and flange of the Davis Wheel give full service without turning. The ductile steel plate and hub safely sustain all the shocks and pounding of modern service.

American Steel Foundries

NEW YORK

CHICAGO

ST. LOUIS



SARCO MINERAL RUBBER ASPHALTS

SARCO No. 6 Waterproofing
SARCO Bituminous Putty
SARCO S-M Paint
SARCO Refrigerator Compound

SARCO Mineral Rubber Floors
SARTAC-Damp-Proofing
SARCO R. S. A. Specifications
SARCO Roof Cement

SARCO PRODUCTS INSURE PURITY AND RELIABILITY

Promptness—Service—Efficiency

SARCO STANDARD ASPHALT & RUBBER CO. CHICAGO, ILL. **SARCO**

CONTINENTAL BAKELITE

The Indestructible rail joint insulation. A perfect non-conductor under all climatic conditions. Write for full particulars.
THE CONTINENTAL FIBRE COMPANY, Newark, Delaware.

DICKINSON DEVICES

Cast Iron Smoke Jacks
Light Fire-Proof Smoke Jacks
Ventilators All Materials
Cast Iron Chimneys
Cast Iron Buildings
Telephone Booths

PAUL DICKINSON Inc., 3346 South Artesian Ave., Chicago

Specify BUCKEYE JACKS

and be assured that you are getting the best jack in design, capacity and longevity that is manufactured

Send for Catalogue

BUCKEYE JACK MFG. CO. ALLIANCE OHIO

GOLD CAR HEATING & LIGHTING CO.

ECONOMICAL—SYSTEMS OF MERIT—WILL NOT FREEZE

VAPOR SYSTEMS

PRESSURE SYSTEMS

VAPOR AND PRESSURE SYSTEMS

HOT WATER SYSTEMS

ELECTRIC SYSTEMS

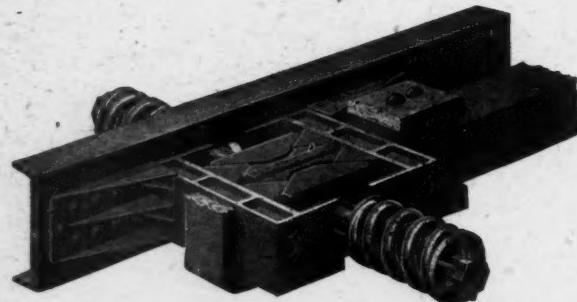
AUTOMATIC HEAT CONTROL FOR ALL SYSTEMS—VENTILATORS
17 BATTERY PLACE, NEW YORK

CHASE GOAT BRAND PLUSHES AND CHASE IMITATION LEATHER

Quality standards are fixed and dependable
Several months ago a seat cover of Chase Plush was sent to us with the statement that it had been in continual service for twenty-four years.

L. C. CHASE & CO.

88 Franklin Street, BOSTON. 326 W. Madison Street, CHICAGO. 321 Fourth Avenue, NEW YORK. 368 Majestic Bldg., DETROIT

Cardwell Friction Draft Gear

Union Draft Gear Company
Chicago - - - Illinois

**The Efficient Drafting Room**

Many men, working together on delicate drawings, must necessarily focus their energy on the work alone. A lead that breaks, or crumbles the smallest bit, or has the slightest trace of grit, must be thrown aside.

DIXON'S ELDORADO

"the master drawing pencil"

can be depended upon for the most difficult pencil work. In any of the 17 grades there is the same uniform quality that makes Dixon's Eldorado the best pencil for the most efficient drafting room.

Full-size samples sent on request on your letter head; please specify degrees chiefly used.

JOSEPH DIXON CRUCIBLE COMPANY

DIXON'S BEST WHITE N^o 352
writes white on blueprints

Dept. 105-J
Jersey City
New Jersey

Railway Age Gazette

Volume 61

December 1, 1916

No. 22

Table of Contents

EDITORIALS:

| | |
|--|-----|
| Safety First in the Despatcher's Office..... | 977 |
| Improvements in Switching Engines..... | 977 |
| New Demurrage Rates Suspended..... | 977 |
| The Case For Better Railroad Regulation..... | 978 |
| *Colorado & Southern..... | 979 |
| *Minneapolis, St. Paul & Sault Ste. Marie..... | 980 |
| *Northern Pacific | 981 |

| | |
|------------------|-----|
| NEW BOOKS: | 982 |
|------------------|-----|

LETTERS TO THE EDITOR:

| | |
|---------------------------------------|-----|
| Why Maintain Crossing Bells?..... | 983 |
| Further Criticisms | 983 |
| The Cost of Water; E. T. Reisler..... | 983 |

MISCELLANEOUS:

| | |
|---|-----|
| Congressional Inquiry on Railroad Regulation..... | 984 |
| *Illuminated Cautionary Highway Crossing Sign..... | 988 |
| Mechanical Design of Electric Locomotives; A. F. Batchelder..... | 989 |
| *Repairing Flood Damage on the Southern..... | 991 |
| Washington Correspondence | 994 |
| *New Kansas City Terminal Viaduct..... | 995 |
| *A Car for a Valuation Party..... | 996 |
| The Train Despatcher's and Safety First; J. L. Coss..... | 996 |
| New Influences Affecting Passenger Traffic; Samuel M. Felton..... | 997 |
| *Switch Engines for the Louisville & Nashville..... | 998 |
| Electric Headlight Case..... | 999 |

GENERAL NEWS SECTION.....

*Illustrated.

Safety first committees have never discussed—or at least have never published—much about the work of the train despatcher. In an article in another column a western despatcher, J. L. Coss, inquires about this, and mentions a number of items in which the safety of the conditions of work in the despatcher's office could be improved. The reason why committees have not entered this field is, no doubt, very simple; the despatcher's office is the one place where, it seems reasonable to assume, safety has *always* been placed first. It is here that the smallest error produces the worst results. The promotion of safety—the elimination of chances of error—was the subject of thorough and careful study at least thirty years ago, as will be recalled by everybody who has read J. A. Anderson's book, "The Train Wire." But ideals are sometimes neglected, here as in other fields, and there is ample need today for Mr. Coss' warning. We heard recently of a safety first committee, on which there was a train despatcher, but which always met without him!

Of the many mechanical devices for improving the efficiency of locomotives, the superheater and power reverse gear are responsible for a large increase in the work performed by switch engines.

Improvements in Switching Engines The power reverse gear enables the engineer to reverse the engine in a much shorter time, and with less effort than with the ordinary hand-operated reverse gear.

In the article describing the new switching engines for the Louisville & Nashville, published elsewhere in this issue, it is stated that the engineers operating engines so equipped find they can handle 10 to 15 per cent more cars. This has been found to be true on other roads. On one road the increase in work was so great that many times the switching screws that worked with the engines so equipped would become tired out before the end of their working period, and would be allowed to quit early, the number of cars handled by them being so much greater than that handled by the crews working with the ordinary switch engines. The superheater, and to this should be added the brick arch, increases

the boiler capacity to such an extent that greater tonnage can be handled at greater speeds than with switch engines not so equipped. This is particularly true where the switch engines are required to make long hauls, such as in transfer service. The engines are smarter, and will pick up and get away with a string of cars more quickly than the saturated steam engines. In addition to this, the saving in fuel for which both the superheater and the brick arch are responsible is no small item. In several instances these savings have been found to be greater than those made with the same devices in road engine service. The saving in fuel and water shown in the article referred to above is exceptional, and is undoubtedly due to the fact that the saturated steam switch engines were much too small for the work they were called upon to perform.

One of the most weighty bits of news printed in the *Railway Age Gazette* last week filled only three lines—the statement

New Demurrage Rates Suspended on page 960, that the proposed higher demurrage rates for freight cars had been suspended by the Interstate Commerce Commission, until March 31, 1917; or until, quite possibly, no in-

crease will be needed or justified. As the commissioners are doing their best to get at the facts of the car shortage, they cannot be said to be ignorant of the gravity of the situation; and probably the great pressure of prior questions on their time may be the main reason for imposing such a long delay; but the situation is deplorable, nevertheless. In the railroads' latest plea for a revision of the federal regulatory laws, the need of shortening the time to be allowed the commission in which to approve or disapprove rates is placed sixth, and nearly the last in the list; but the present crisis shows that it is by no means last in importance. In scores of the large freight stations of the country it is of the first importance, at this time to impose, in the interest of all concerned, shippers, consignees and carriers, a stiff charge *for the use of the ground* occupied by each car, let alone the value of the car itself. To forbid the increases in these charges until they will be too late to benefit anybody, is the acme of back handed economy. It may be true that

an increased demurrage charge will work some injustice; so do many decisions of the courts. Freight car service is full of small injustices; it is inevitable. A considerable degree of uniformity in practice is essential, and no one has discovered how to secure this uniformity except by the use of rough averages. Is the Interstate Commerce Commission's quest of exact justice to be kept up until the national transportation machine comes to a dead stop from internal friction?

THE CASE FOR BETTER RAILROAD REGULATION

A REMARKABLY broad and sound foundation for the case which the railroads are to present before the Newlands Joint Committee on Interstate Commerce in favor of a radical change in our system of railroad regulation has been laid by Alfred P. Thom, counsel for the Railway Executives' Advisory Committee, in his opening statement before the Newlands committee which is reported elsewhere in this issue.

As an argument Mr. Thom's statement was an example of logical thinking seldom surpassed and the entire subject was presented from the broadest and sincerest standpoint of real statesmanship; fairly and with just regard for the viewpoint of those whose position he was opposing. Mr. Thom did not criticise or impugn the motives of those who were responsible for the system of regulation the defects in which he was calling attention to, nor of the state authorities whose differing views have resulted in the inconsistencies of the present system. He asked nothing for the railways from the standpoint of private interests. He approached the subject entirely from the position of the public, asking that the government direct its powers for the purpose of assisting in obtaining better transportation service for the public.

He accepted regulation as a necessary exercise of government authority, frankly recognizing the occasion for the calling into existence of the present machinery of regulation, but insisted that its present character is due to the fact that it was based on the principles of correction and repression, which while justified by the conditions which were responsible for it do not meet the requirements of the conditions of the present nor of the future. He argued that it is time to follow President Wilson's suggestion for a "fresh assessment of circumstances" with a view to accomplishing a result to which the assistance of the government did not seem necessary when the present policies of regulation had their inception.

Instead of criticising those who are responsible for the conflicting and discriminatory action of the state authorities that is interfering with the possibility of a uniform and consistent governmental policy toward transportation, Mr. Thom showed that such inconsistency is a necessary result of allowing the regulatory authority of the public over transportation instrumentalities to be exercised by so many different bodies and asked that such a vital element of national life be placed under the complete authority of the only body that represents the nation as a whole.

Mr. Thom did not even oppose the doctrine of "states' rights." It is true that the carrying out of the plans he advocated would restrict to some extent what some of those whose horizon is bounded by state lines call the right to regulate their own local affairs, but he showed that most of these affairs are no longer local but part of a national system of commerce, and that by too great insistence on the local rights which the states reserved when they became a part of the federal union they have allowed to become obscured some of the even more important rights which they acquired by entering the union. In fact he used the same arguments which led the states to enter the union and which led them to delegate to the federal government jurisdiction over the navigable waterways of the country, the principal means of transportation known at that time, to show that the states

collectively can obtain better results from their efforts to regulate the nation's commerce today than they can by acting separately.

In brief Mr. Thom showed that the present policy of government toward transportation had its genesis in the abuses of the past and was therefore punitive rather than constructive in character; that it has practically accomplished the direct results which it was intended to accomplish by preventing abuses and protecting against exorbitant rates, but that it has failed to insure to the public adequate transportation facilities because it was not designed for that purpose. He showed that recent events, such as the present car shortage, the recent congestion of traffic and the practical cessation of railway construction, have demonstrated that it is time to instill into the system of railroad regulation the element of helpfulness and encouragement and to place upon those who are opposing any change the burden of proving that the present system is adequate. He has therefore undermined in advance the arguments of those who may be expected to tell the committee that the present method of regulation only needs to be supplemented by the passage of additional laws, of the same character as those that make up the patchwork of which our present system consists, giving various commissions power to take over still more of the functions of management but without imposing upon them any of the responsibility that should be inseparable from authority.

A pertinent example of this kind of argument is afforded by the action of the National Association of Railway Commissioners in appointing a committee to urge an amendment to the commerce law giving the Interstate Commerce Commission jurisdiction over car distribution. It has been announced that this committee desired to appear before the Newlands committee. It will doubtless have a great deal to say about the evils of a car shortage and will propose to remedy the condition by the passage of another law. The railroads have not made such a conspicuous success of their own efforts to make an inadequate supply of facilities meet an abnormal demand for them to be able to present a very effective argument against a claim that the commission could make a better job of it, but we venture to predict that the next time we have a car shortage it would be found that the proposed law had not created any new cars, had not moved the cars any faster and had not increased the amiability of the shipper who cannot get a car when he wants one. Then perhaps the next crop of state commissioners will ask Congress to enact a law requiring the railroads to buy cars.

The whole proceeding reminds us of the efforts of the city of Milan, Italy, in the seventeenth century, to regulate the price of bread by law at a time of famine by forcing the bakers to sell at the legal price. As long as the immediate supply lasted the law was exceedingly popular but it soon became necessary to enact another law limiting the quantity which any one might buy. The next step was to pass a law fixing the price at which the raw materials should be sold to the bakers. People from the neighboring territory flocked to Milan to enjoy the low prices but the scheme appears to have fallen down at the point where the crops were exhausted, because nature was not subject to the laws of Milan.

What the railroads ask is that since the government has elected to fix the price at which transportation shall be sold it shall give some one body the authority to fix a price high enough to cover the cost, which includes the cost of the capital required to buy enough cars and enough terminal facilities to furnish the transportation demanded. If the price should ever be found to be too high the government's representative already has the power to reduce it.

At the present time the representative of the national government, the Interstate Commerce Commission, has fixed certain prices for transportation which some of the states have chosen to nullify to the best of their ability. On the very

day that the Newlands committee began its hearings the railroads of Illinois asked the United States district court at Chicago to restrain the state of Illinois from interfering with their efforts to obey an order of the Interstate Commerce Commission fixing a rate for passenger transportation. Even

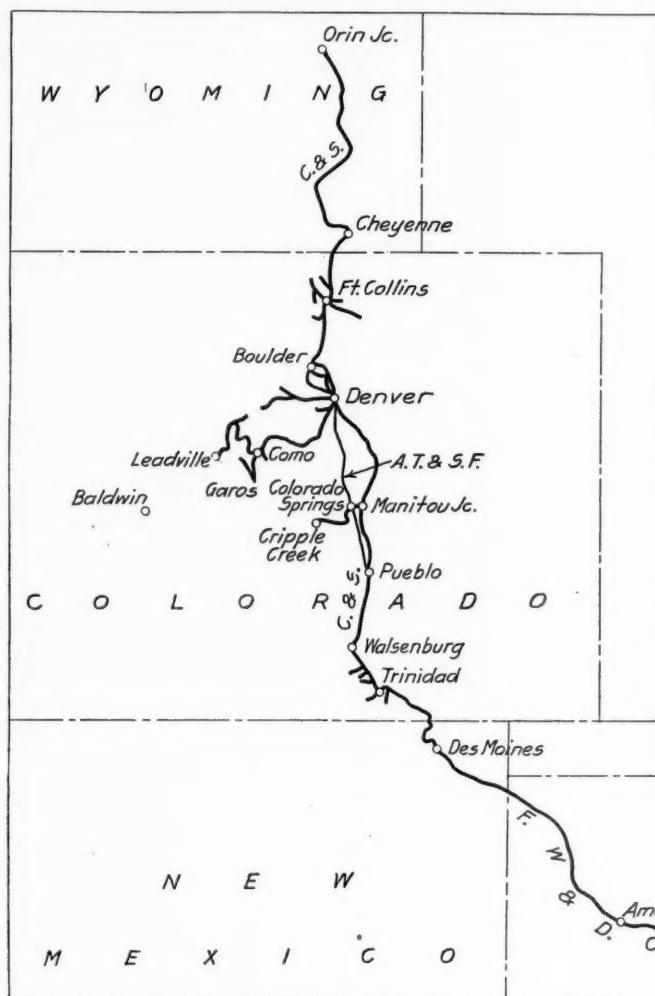
and that transportation must also be paid for. If it is not paid for directly by those who use it, it will be paid for by taxation. The Milan method did not last from one harvest to another. The American system of railroad regulation has endured somewhat longer. The Roman empire had a still longer life but it fell eventually. The law of supply and demand and the law of compensation, we believe, are still in force.

COLORADO & SOUTHERN

NEVER before in its history has the Colorado & Southern had as low a ratio of transportation expenses to total operating revenues as in the fiscal year ended June 30, 1916. In both 1910 and 1911 total operating revenues were larger than in 1916. In 1916 almost as much was spent for maintenance of way as in either 1910 or 1911. And more was spent in maintenance of equipment than in either of these years. Had it been considered expedient by the management the Colorado & Southern could have resumed the full 4 per cent dividends on both the first preferred and the second preferred stock and still have had a substantial sum to carry to profit and loss.

Total operating revenues in 1916 amounted to \$15,707,000 as compared with \$14,173,000 in 1915 and with \$16,778,000 in 1910. Total operating expenses in 1916 amounted to \$9,979,000, comparing with \$10,111,000 in 1915 and with \$10,863,000 in 1910. There was spent on maintenance of way \$2,003,000 in 1916, \$1,741,000 in 1915 and \$2,189,000 in 1910. There was spent on maintenance of equipment \$2,775,000 in 1916, \$2,723,000 in 1915 and \$2,521,000 in 1910. Transportation expenses in 1916 amounted to \$4,444,000; in 1915, \$4,908,000, and in 1910, \$5,379,000.

In 1916 the Colorado & Southern paid 2 per cent dividends on its first preferred calling for \$170,000, and made



The Colorado & Southern

if it be assumed that they will succeed in their efforts the fact that they required the assistance of a federal court to do so demonstrates the need of some improvement in the rate-regulating machinery.

The Newlands committee will probably hear from many who think that shippers can be supplied with cars in the same way that the city of Milan tried to feed its people, by legislative fiat.

It will also hear from some who have an even more ancient remedy to suggest. When the populace of Rome clamored for bread the government used to buy corn and give it to them. Some people want our government to buy the railroads and sell their services to the people at the price the people want to pay.

The raw materials of transportation include credit as well as cars and terminals, just as the raw materials of bread include credit as well as corn and wheat. Neither the Roman nor the Milan methods affected the supply of the raw materials. Our government has tried to encourage an increase in the supply of agricultural products; it has recently even taken some steps to improve the credit of the farmer. Unless it approaches the subject of railroad credit in a similar spirit it will have to adopt the Roman method and furnish the railroad credit itself.

In any event the fact should be borne in mind that somebody paid for the corn that was given to the people of Rome,



an appropriation of \$280,000 from income for additions and betterments. There was also an appropriation for purposes not specified of \$500,000 from income and the company carried \$1,202,000 to profit and loss. Besides the "miscellaneous" appropriations from income of \$500,000 there was an appropriation of \$500,000 from profit and loss. This

makes a total at the end of 1916 of \$2,000,000 carried on the balance sheet as appropriated surplus not specifically invested. Presumably this is to cover any loss which may develop in connection with the Trinity & Brazos Valley, which had previous to the Chicago, Rock Island & Pacific receivership been controlled jointly by the Colorado & Southern and the Rock Island and which is now being operated at a deficit.

The quite remarkable saving made in transportation expenses is, from the operating man's point of view, the most interesting thing in this year's report. The total ton-miles of revenue freight in 1916 amounted to 1,187,559,000, an increase of 21 per cent. The total number of passengers carried one mile amounted to 131,812,000 in 1916, an increase of 5 per cent. Freight train miles totaled 2,854,000 in 1916, a decrease of 163,000 as compared with 1915, and passenger train miles totaled 2,403,000, a decrease of 148,000. The revenue trainload in 1916 was 389 tons, an increase over the previous year of 81 tons; this is an increase of over 26 per cent. Loaded car miles totaled 55,944,000 in 1916, an increase of 6,004,000 over 1915, while empty car miles totaled 23,399,000 in 1916, a decrease of 1,734,000. This much smaller percentage of empty car mileage obviously helped to bring up the average trainload. Before, however, seeking an explanation of the smaller empty car mileage it is interesting to compare mileage and transportation cost figures in 1916 and 1910. The mileage of road operated in 1916 was 1,836, and in 1910 2,042. The revenue ton mileage in 1910 was 1,249,390,000, or slightly greater than in 1916. The revenue passenger mileage was 159,880,000 in 1910, or considerably more than the passenger mileage in 1916. Freight train mileage in 1910 totaled 4,079,000, comparing with 2,805,000 in 1916. The revenue trainload in 1910 was 306 tons, comparing with 389 tons in

in 1910, and iron ore, 5.94 in 1915 and 7.71 in 1910. Products of agriculture furnished 24.84 per cent of the total in 1915 and only 11.91 per cent in 1910. The total tonnage of products of agriculture in 1916 amounted to 1,526,000; in 1915 to 1,602,000, and in 1910 to 995,000.

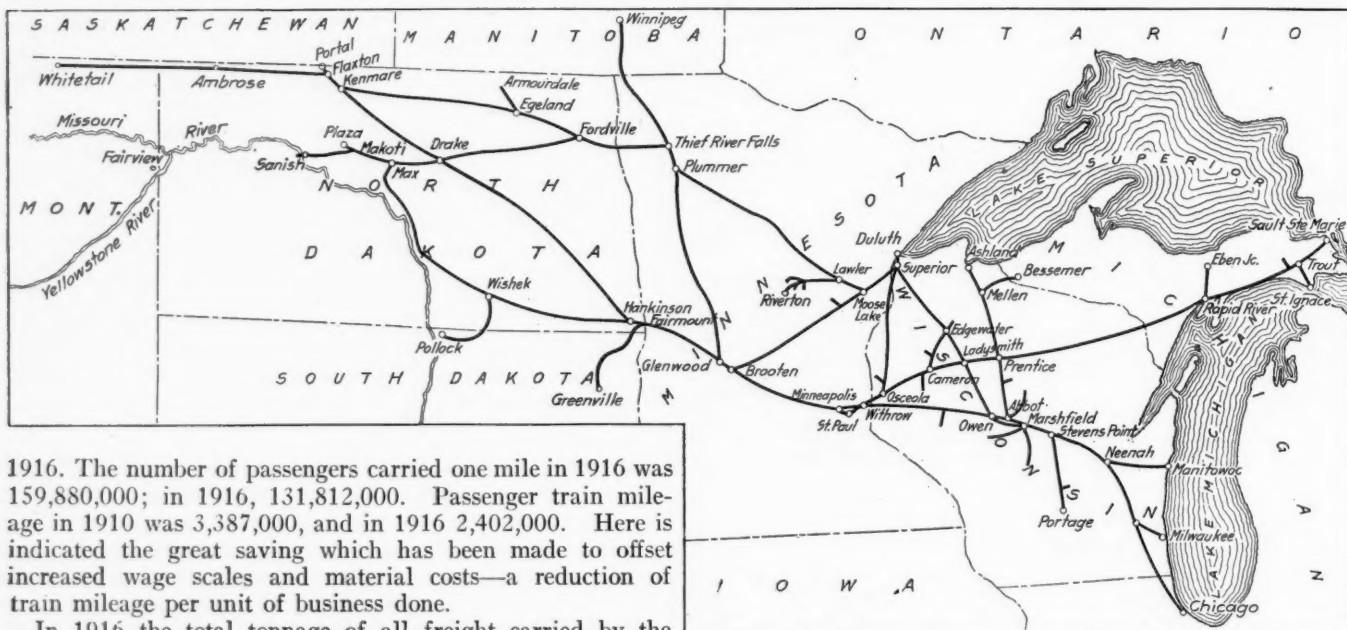
At the end of 1916 the Colorado & Southern had \$3,642,000 cash on hand, no loans and bills payable, and during the year had spent \$318,000 for additions and betterments and paid off \$320,000 of indebtedness. No new securities were issued during the year.

The table below shows principal figures for 1916 and 1915:

| | 1916 | 1915 |
|---|--------------|-------------|
| Average mileage operated..... | 1,836 | 1,840 |
| Freight revenue | \$11,371,287 | \$9,960,044 |
| Passenger revenue | 3,378,626 | 3,294,688 |
| Total operating revenue..... | 15,707,311 | 14,172,978 |
| Maintenance of way and structures | 2,002,136 | 1,741,313 |
| Maintenance of equipment | 2,775,183 | 2,723,292 |
| Traffic expenses | 204,168 | 215,497 |
| Transportation expenses | 4,443,906 | 4,908,458 |
| General expenses | 474,026 | 441,091 |
| Total operating expenses..... | 9,978,609 | 10,110,875 |
| Taxes | 735,781 | 616,053 |
| Operating income | 492,565 | 3,445,566 |
| Gross income | 5,589,594 | 4,100,438 |
| Net income | 2,222,994 | 615,149 |
| Sinking funds | 70,298 | 61,383 |
| Dividends | 170,000 | ..... |
| Additions and betterments..... | 280,220 | ..... |
| Miscellaneous appropriations | 500,000 | ..... |
| Surplus | 1,202,475 | 553,767 |

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE

A BIG wheat crop means pretty surely large gross earnings for the Minneapolis, St. Paul & Sault Ste. Marie, and the wheat crop that was moved in the fiscal year ended June 30, 1916, in the territory served by the Soo was the greatest in the history of the country. Total operating revenues of the Soo amounted to \$22,805,000, comparing with



1916. The number of passengers carried one mile in 1916 was 159,880,000; in 1916, 131,812,000. Passenger train mileage in 1910 was 3,387,000, and in 1916 2,402,000. Here is indicated the great saving which has been made to offset increased wage scales and material costs—a reduction of train mileage per unit of business done.

In 1916 the total tonnage of all freight carried by the Colorado & Southern was 7,409,000; in 1915, 6,450,000, and in 1910, 8,357,000. The average ton-mile rate in 1916 was 9.58 mills; in 1915, 10.13 mills, and in 1910, 9.64 mills. Of the total tonnage carried in 1916 62.66 per cent originated on the Colorado & Southern lines; in 1915, 65.11 per cent, and in 1910, 66.74 per cent. Of the total tonnage carried in 1916 22.35 per cent was bituminous coal, 8.78 lignite and 7.14 coke, with 3.01 per cent furnished by precious ores and 8.30 per cent. by iron ores. Products of agriculture furnished 20.59 per cent. of the total tonnage. In 1915 bituminous coal furnished 23.17, and in 1910 29.67; lignite, 9.72 in 1915 and 9.23 in 1910; coke, 5.74 in 1915 and 7.98 in 1910; precious ore, 3.26 in 1915 and 6.10

The Minneapolis, St. Paul & Sault Ste. Marie

\$17,818,000 in the previous year. The greater part of this large increase in gross earnings was saved for net. Operating expenses amounted to \$12,160,000 in 1916, comparing with \$11,060,000 in 1915. Net income available for dividends amounted to \$6,170,000 in 1916 as against \$2,974,000 in 1915.

The Minneapolis, St. Paul & Sault Ste. Marie operates 3,148 miles of road. It controls the Wisconsin Central, operated as the Chicago division of the Soo but with accounts kept separately. The mileage of the Wisconsin Central is 1,120. In 1916 total operating revenues of this

company amounted to \$12,205,000, comparing with \$9,945,000 for 1915. Operating expenses amounted to \$6,921,000, comparing with \$6,752,000. There was available for dividends in 1916 \$2,057,000, and in 1915 \$137,000. The Soo itself paid 7 per cent on both its preferred and common stock in both 1915 and 1916. The Wisconsin Central paid 4 per cent on its preferred stock in both 1916 and 1915.

There is a striking difference in the character of the traffic on the Soo itself and its Chicago division. The total tonnage carried on the Soo was 9,323,000; on the Chicago division the tonnage amounted to 7,536,000. Of the total tonnage of the Soo 25.40 per cent was grain, while of the total tonnage of the Chicago division only 5.67 per cent was grain in 1916. Bituminous coal furnished only 4.83 per cent of the total tonnage of the Soo and 8.41 per cent of the total tonnage of the Chicago division. Ores furnished 14.28 per cent of the Soo's tonnage and 19.72 per cent of the Chicago division's tonnage. The effect of the bumper wheat crop in the fall of 1915 is reflected in a total tonnage of grain carried by the Soo of 2,368,000 tons, comparing with 1,386,000 tons carried in the year ended June 30, 1915. The tonnage of grain carried by the Chicago division was 427,000 in 1916, comparing with 249,000 in 1915.

The Soo got no better balanced traffic in 1916 than in 1915, the average number of empty cars per train being 7.93 in 1916 and 7.83 in 1915. No new road engines were received during the year or in the previous year. Nevertheless, trainloading in 1916 showed a big gain over 1915. The

cash, with \$546,000 matured interest dividends and funded debt unpaid.

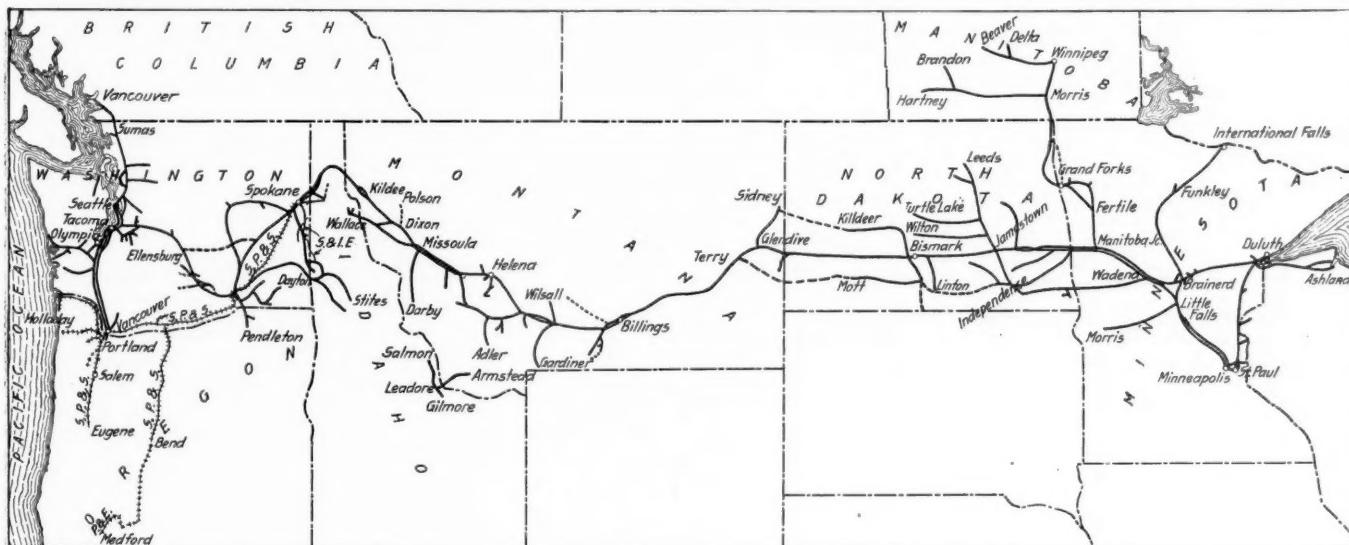
The following table shows the principal figures for operation in 1916 as compared with 1915:

| | Soo 1916 | 1915 | Wisconsin Central 1916 | 1915 |
|--|--------------|--------------|------------------------------|-------------|
| Average mileage operated.. | 3,148 | 3,044 | 1,124 | 1,120 |
| Freight revenue | \$16,873,152 | \$12,576,374 | \$9,308,075 | \$7,237,916 |
| Passenger revenue | 4,259,209 | 3,810,891 | 2,098,364 | 1,994,824 |
| Total operating revenue... Maintenance of way and structures | 22,804,829 | 17,817,855 | 12,205,239 | 9,945,370 |
| Maintenance of equipment | 2,117,844 | 2,096,307 | 1,113,103 | 1,211,190 |
| Traffic expenses | 2,867,740 | 2,724,036 | 1,325,935 | 1,252,718 |
| Transportation expenses.. | 370,749 | 337,332 | 262,078 | 260,189 |
| General expenses | 6,263,033 | 5,495,980 | 3,905,342 | 3,734,415 |
| Total operating expenses... | 12,160,318 | 11,059,594 | 6,920,750 | 6,751,780 |
| Taxes | 1,537,712 | 1,135,439 | 766,464 | 667,614 |
| Operating income | 9,106,795 | 5,622,822 | 4,518,025 | 2,525,976 |
| Gross income | 10,054,211 | 6,666,787 | 4,569,871 | 2,587,257 |
| Net income | 6,169,576 | 2,974,004 | 2,056,858 | 136,732 |
| Dividends | 2,646,714 | 2,646,714 | 450,612 | 450,688 |
| Surplus | 3,522,862 | 327,290 | 1,606,246 | *313,956 |

*Deficit.

NORTHERN PACIFIC

HIGH prices for grain are more likely to be reflected in an increased total operating revenue for the Northern Pacific than a large grain crop with low prices, because the general prosperity of the territory served is more important in effecting revenues than is the increase in tonnage of the single commodity grain. In 1916, however, the Northern Pacific's income was most favorably affected not only by the general prosperity of the territory served, due to



The Northern Pacific

average number of tons per train was 463 last year as against 396 in the previous year. The gain in trainloading is in large measure the reason why the management was able to hold down transportation expenses so well. These expenses amounted to \$6,263,000 in 1916 as compared with \$5,496,000 in 1915. Besides the saving attributable to heavier trainloading there was a substantial saving made in loss and damage to freight. The payments on this account in 1916 amounted to \$136,000 and in 1915 to \$195,000.

Neither the Soo nor the Wisconsin Central sold any new securities during the year and the Soo reduced its outstanding indebtedness by the retirement at maturity of \$982,000 equipment trust bonds. The Wisconsin Central reduced its outstanding funded debt by the retirement of \$368,000 equipment trust certificates and \$776,000 Chicago, Wisconsin & Minnesota first mortgage bonds. The net expenditure for the two companies for additions and betterments amounted to \$465,000. At the end of the year the Soo had \$6,735,000 cash, with \$1,463,000 matured interest and dividends unpaid and the Wisconsin Central had \$1,555,000

very high prices for grain, but also by an extraordinarily large crop, and furthermore by an extraordinarily heavy movement of ores and consequent prosperity in the mining regions in Montana. The heavy increase in traffic was handled with no additions to freight locomotives, with a much larger increase in proportion of empty freight car mileage, and yet with an average trainload of 717 tons, or 7.27 per cent greater than in 1915. The operating ratio of the Northern Pacific in the fiscal year ended June 30, 1916, was 53.16, comparing with 58.74 in 1915. This is one of the lowest operating ratios of any large railroad in the country. After paying 7 per cent on its stock, calling for \$17,360,000, there was a surplus in 1916 of \$8,370,000, notwithstanding a decrease of \$1,855,000 in income from securities owned, due to the fact that no dividends were paid by the Northwestern Improvement Company or the Northern Express Company in 1916, whereas the Improvement Company dividends in 1915 amounted to \$1,355,000 and the express company dividends to \$500,000.

The Northern Pacific operated 6,461 miles of road June

30, 1915. There was a slight increase only in mileage during the year—40 miles, due to two short branches being added to the mileage operated, one in Montana and one in Washington. The company is about to begin construction of a line from Dixon, Mont., to Polson, through what is known as the Flathead country to the south shore of Flathead lake, and another line from Billings, Mont., north and west into the Lake Basin country. This line will serve a very rich agricultural country.

Of the total Northern Pacific mileage 2,882 miles is main line and 3,622 branch lines. The total revenue per mile of road in 1916 was \$11,373. This was an increase of 19 per cent over the previous year and was divided \$8,727 from freight and \$2,646 from passenger-train service. The increase in revenues was almost entirely from freight, there being an increase of less than 2 per cent in the revenues from passengers per mile of road. The passenger business increased a little more than this would indicate, the number of passengers carried one mile being 616,681,000, an increase of 2.73 per cent; but the average rate per passenger per mile was 2.246 cents, a decrease of slightly over one per cent. The total tonnage of freight carried amounted to 20,996,000, an increase of 19.12 per cent, and the average haul was 334 miles, an increase of 41 miles, or a little over 14 per cent, making the increase in ton mileage 35.88 per cent. The average receipts per ton per mile were 7.93 mills, a decrease of 6.60 per cent.

The table below shows the tonnage of each of the general classes of commodities in 1916 and 1915, and the percentage of the tonnage of each class to the total for the year:

| | 1916 | | 1915 | |
|--------------------------------|------------|----------|------------|----------|
| | Tonnage | Per cent | Tonnage | Per cent |
| Products of agriculture | 5,204,752 | 24.79 | 4,283,812 | 24.31 |
| Products of animals | 448,460 | 2.13 | 351,344 | 1.99 |
| Products of mines | 6,305,738 | 30.03 | 5,075,091 | 28.79 |
| Products of forests | 6,013,969 | 28.64 | 5,176,410 | 29.37 |
| Products of manufactures | 1,746,555 | 8.33 | 1,461,894 | 8.30 |
| Miscellaneous | 379,843 | 1.81 | 377,217 | 2.14 |
| L. C. L. | 896,376 | 4.27 | 899,457 | 5.10 |
| Total | 20,995,693 | 100.00 | 17,625,225 | 100.00 |

Total operating expenses amounted to \$40,366,000, an increase of only \$3,258,000. Of this increase \$529,000 was in maintenance of equipment and \$310,000 in maintenance of way, leaving an increase in transportation expenses of \$1,913,000, the total for transportation in 1916 being \$20,900,000. This is an increase of only 10.08 per cent in the out-of-pocket cost of doing the business, with an increase of 35.88 per cent in the tons of revenue freight carried one mile, and of 2.73 per cent in the passenger mileage.

There was a substantial saving made in payments for damage to property, the total on this account being \$102,000 in 1916, or \$35,000 less than in the previous year. On the other hand, the payments for injuries to persons were greater by \$101,000, the total in 1916 being \$520,000. The increase in cost of fuel was a little more proportionately than the total increase in transportation expenses. Fuel for train locomotives in 1916 cost \$4,817,000, an increase of 12.7 per cent. Presumably the Northern Pacific was affected by the higher prices for fuel coal, which were general in the West.

During the year a total of \$4,182,000 was spent for extensions and additions and betterments, exclusive of equipment. This included \$781,000 for real estate in Superior, Wis., \$994,000 for grade separation work in Spokane, Wash., and \$723,000 for station buildings and fixtures. No bonds were issued during the year and \$557,000 bonds were purchased and cancelled under sinking fund provisions. At the end of the year the company had \$18,305,000 cash on hand, and no loans and bills payable.

The following table shows the principal figures for operation in 1916 as compared with 1915:

| | 1916 | 1915 |
|-------------------------------|--------------|--------------|
| Average mileage operated..... | 6,501 | 6,461 |
| Freight revenue | \$55,656,395 | \$43,833,637 |
| Passenger revenue | 13,852,254 | 13,619,114 |

| | | |
|-----------------------------------|------------|------------|
| Total operating revenues..... | 75,939,231 | 63,171,653 |
| Maintenance of way and structures | 8,833,210 | 8,523,657 |
| Maintenance of equipment..... | 7,846,259 | 7,317,074 |
| Traffic expenses | 1,177,971 | 1,191,567 |
| Transportation expenses | 20,900,055 | 18,987,056 |
| General expenses | 1,134,020 | 1,104,712 |
| Total operating expenses..... | 40,366,412 | 37,108,049 |
| Taxes | 5,073,415 | 4,470,959 |
| Operating income | 30,493,190 | 21,588,494 |
| Gross income | 38,972,448 | 32,031,453 |
| Net income | 25,729,874 | 18,822,820 |
| Dividends | 17,360,000 | 17,360,000 |
| Surplus | 8,369,874 | 1,462,820 |

NEW BOOKS

Standards of the American Society for Testing Materials. Edited by Edgar Marburg, secretary-treasurer. 737 pages, illustrated, 6 in. by 9 in. Bound in cloth. Published by the American Society for Testing Materials, Philadelphia, Pa. Price \$7.50.

Beginning with 1910 the standards adopted by this society have been published annually in a year book which also contained the proposed tentative standards which had not yet been accepted by the association. Beginning with the present volume the standards will be published bi-annually and will include only those which have been formally adopted by the society, excluding those which are only tentative.

Among the specifications of most interest to railway men are those for rails, splice bars, track bolts, bridge steel, axles, forgings for locomotives and car wheels, tires, boiler and firebox steel, staybolt iron, copper wire and Portland and natural cement. As this society is composed of representatives of the manufacturers and the users of these materials, the specifications which have been adopted from time to time may be considered to represent the best practices from their combined view points.

The Railway Library and Statistics for 1915. Compiled and published by Slason Thompson, director Bureau of Railway News and Statistics. 460 pages, 8 1/4 in. by 5 1/2 in. Bound in cloth. Price \$1.

This is the seventh edition of Mr. Thompson's valuable annual collection of addresses and papers on railway subjects compiled for the purpose of bringing together in one volume some of the more noteworthy publications bearing on important phases of the railway problem which have appeared during the year. Following the practice of preceding issues, the volume for 1915 begins with several articles descriptive of early railroading in the United States, including the story of how 186 separate organized companies have been consolidated into the New York Central and a brief sketch of the life of the late James J. Hill, which naturally brings in much interesting history of early railway extension into the far west. Then follow brief discussions of the railway situation in some of the principal countries of Europe as affected by the war, and a discussion of the relation of American railways to preparedness. The various questions relating to government regulation of the railways, which are especially prominent just now because they are to be made the subject of investigation by the joint congressional committee on interstate commerce, are discussed in Otto H. Kahn's paper on "The Government and the Railroads," Senator O. W. Underwood's address on "Government Regulation and Our Transportation System," a paper by Walker D. Hines on "The Conflict Between State and Federal Regulation," and an article on "Government Ownership in Canada" by Frank Trumbull.

The volume also includes timely articles on traffic matters, federal valuation, railway mail pay, the waterways movement and the railway wage question. Some interesting comparisons between American and German railways are presented in two translations, one of which includes statistical comparisons, and another a comparison of sleeping car travel in America and Germany. As in former issues, the concluding chapter consists of the annual statistical report of the bureau.

Letters to the Editor

WHY MAINTAIN CROSSING BELLS?

NEW ROCHELLE, N. Y.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with interest your editorial of November 24, suggesting that highway crossing signals should be visual rather than audible. You have opened up a large question. If you once start it where are you going to stop?

I think that in these days the money spent in installation and maintenance of a crossing alarm bell is money wasted, for to the automobile driver, our greatest "risk," it gives no protection whatever. He comes on at such a furious pace that no warning is of any value to him unless he apprehends it some distance before he reaches the crossing. He needs a distant signal just as much as does the Twentieth Century Limited. There are, of course, a few cautious and careful motorists; but it is the highflyers that we have to deal with.

Again, when you consider the cost of the bell-ringing apparatus, bear in mind that any device dependent upon the track circuit for operation is of no value in territory where trains are frequently stopping, or where there is switching.

The question in my mind is, if we should all agree that the audible signal is of no use as a means of protection and that visual signals should be installed, why not go a step further, and do away with the automatic feature at every crossing? Simply have the standard caution approach sign, to notify the traveler on the highway that he is approaching a crossing, and then let him depend on his eyes to get over the tracks safely. I believe that the man who will not stop for the fixed sign, will pay but little attention to an automatic device, where there is real danger. Money not used in the maintenance of crossing alarm bells can be used for watchmen at crossings equipped with gates.

However, the end to work for is to make the motorists and other travelers do their part. Until that can be done the "accidents" will go on, in spite of all the protection that can be devised.

G. M.

FURTHER CRITICISMS

NEW YORK.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Your editorial suggesting that highway crossing signals ought to be visual rather than audible is a reminder that we are today asking a good many things of the automatic apparatus. We shall be obliged before long to modify our position. These signals sometimes fail; and there is trouble, instead of peace, if a signal cries wolf when there is no wolf. Exasperated citizens, annoyed by a poorly-cared-for bell will hold a grudge against the railroad for years. I think the general idea is well worth attention, as regards places where an automatic warning is appropriate. A competent signal department can keep automatic block signal failures down to 1 in 20,000 and false-clear failures down to 1 in a million; and why cannot an equally good record be made with crossing warnings?

But why all this expense, anyway? The traffic on many highways is now so dense and the chances that a careless driver will get no benefit from any warning (howsoever good it may be) seem to be increasing so rapidly, that we may well consider whether a gate, and a strong one, is not the only suitable protection. If motorists and other drivers would do their part, no moving or changing signal would be necessary. A sign, sufficient to show the exact location of

the crossing is all that is needed. At a railroad crossing—crossing of one track with another—no one would think of going to the expense of putting up and maintaining signals, where all movements on one of the roads are made with speed under control, unless in case of dense traffic. And for dense traffic at highway crossings there is no problem; gates are provided already.

You have printed, recently, a proposed law requiring automobiles to stop before crossing a track. This is only a reasonable proposition. I say this deliberately, though I know that every speed fiend, and many respectable people also, will laugh at me. It should apply as well to people driving horses. Surely the stop rule is reasonable, at least to the extent that in every case of a person crossing a track the whole responsibility for safety rests on him, not on the railroad company. To any one who contends this view—who thinks that it is too liberal toward the railroad—I say, Would you like to have all railroad trains reduce speed at every crossing to six miles an hour? That is the only logical process, if you are going to throw the responsibility on the railroad; and, of course, every person who rides in a passenger train knows that he would not consent to such a return to slow-coach days.

Did you ever stop to think that these hundreds of electric crossing bells, all over the country, have been installed for just this one reason; that people approaching crossings may indulge themselves in the lazy and shortsighted practice of *not* using their eyes and ears!

C. N. B.

THE COST OF WATER

TAMAQUA, Pa.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

P. M. LaBach, in the issue of Sept. 1, page 368, demonstrates that it is impracticable to arrive at any true comparison of the efficiency of the water service department on the various railroads. Conceding this and recognizing the wide range of conditions it is difficult to see what benefit can be secured by attempting to establish unit costs for water service. Improved practices and proper supervision may be conducive to efficiency, but the present tendency is towards greater expenditures for water in order to supply a better quality of boiler water, to ensure an ample supply for all requirements and to deliver the water at such locations as will contribute to efficiency of operation as a whole. Any attempt to make a feature of the unit cost of such relatively insignificant items as water and oil may draw attention from such larger items as fuel, train crews, engine repairs, etc.

The writer recalls a recent instance where a desire to reduce the cost of water led to the abandonment of water treatment where the scale-forming material was close to the low limits recommended for treatment. A few months' trial showed a material increase in scale and a test of fuel conducted by the officer recommending the abandonment, showed such results as to bring urgent action for a return to treatment.

It may also be noted that the great supply of the Pennsylvania Railroad in the Pittsburgh district was not installed to reduce the unit cost of water, but to facilitate the handling of freight, and there is no question that the benefits secured by this supply so greatly improved operating conditions along the old line that little has since been heard of the development of a new freight line north of Pittsburgh. An ample supply of water for railroads and manufacturers at Syracuse and Rochester, N. Y., are examples of increased efficiency secured by increasing the unit cost of water.

Let us give proper consideration to the smaller items of operating cost, but not at the expense of such major items as fuel consumption, train speed, tonnage or engine maintenance.

E. T. REISLER.

Congressional Inquiry on Railroad Regulation

Opening Statement Presented by Alfred P. Thom,
Counsel For Railway Executives' Advisory Committee

ALFRED P. THOM, counsel for the Railway Executives' Advisory Committee, last week presented the opening statement on behalf of the railroads at the hearing before the Newlands Joint Committee on Interstate Commerce at Washington. Mr. Thom occupied three days, November 23, 24 and 25, in outlining the case for the carriers as to what they regard as the defects in the present system of railway regulation and their proposed remedies for its improvement, and he was questioned by the committee on Monday and Tuesday of this week. On Saturday he outlined the suggestions of the railroads as to the principles which they believe should be incorporated in any system of regulation, as follows:

THE PROPOSALS OF THE RAILWAYS

"1. The entire power and duty of regulation should be in the hands of the national government, except as to matters so essentially local and incidental that they cannot be used to interfere with the efficiency of the service or the just rights of the carriers.

"2. As one of the means of accomplishing this, a system of federal incorporation should be adopted, into which should be brought all railroad corporations engaged in interstate or foreign commerce. Such a system of federal incorporation should be compulsory and not elective. It should also preserve to corporations reincorporating under it, not only all their contract rights and other assets of all sorts, but also their existing charter powers, except as to any feature contrary to an act of Congress, and should also confer upon them the general powers conferred upon all corporations by the federal act.

"3. The Interstate Commerce Commission has, under existing law, too much to do and is consequently forced to confide to subordinates important functions which the regulating body ought to be in a position to perform itself. The Interstate Commerce Commission is likewise clothed with different functions which are inconsistent and violate the principle that the legislative, executive and judicial departments should be kept separate and distinct.

"To reduce the pressure upon the Interstate Commerce Commission and to separate these inconsistent functions, there should be withdrawn from the Interstate Commerce Commission all duties except those which are judicial and constructive, such as the power over rates and routes, and powers affecting the revenues of carriers, and the remaining duties, being mainly those of supervision, detection, prosecution and correction, should be conferred upon a new commission, which may be named the Federal Railroad Commission.

"In order to co-ordinate and harmonize the system of regulation, the Interstate Commerce Commission should be made the supreme regulating body and should have a right of review of any order made by the Federal Railroad Commission.

"The salaries of the members of the Interstate Commerce Commission should be increased and their terms of office extended. The salaries of the members of the Federal Railroad Commission, who should be appointed by the President and confirmed by the Senate, should also be made adequate, and they should be given long terms.

"Regional Commissions should be established which should assist the Interstate Commerce Commission in exercising its jurisdiction, and to that end should make all such investigations, and hear and determine all such complaints, and should perform such other duties, as the Interstate Com-

merce Commission may from time to time by general or special order direct. The members of these regional commissions should be presidential appointees, at adequate salaries and for long terms. The orders of the regional commissions should not become effective until approved by the Interstate Commerce Commission but should stand approved, as of course, unless excepted to within a time to be limited. The regions should be created with reference to lines and systems of transportation and need not be defined geographically. Each regional commission should be located in such place in its district as the Interstate Commerce Commission directs, but it should be authorized to hold its sessions and perform its duties in any other district when so directed by the Interstate Commerce Commission.

"4. The power of the Interstate Commerce Commission over rates should be extended so as to authorize it to prescribe minimum rates in addition to its present power to prescribe maximum rates; and it should also be given the express power to determine the relation of rates or differentials whenever necessary or appropriate to establish or maintain a rate structure or a relation or a differential found to be just and proper by the Interstate Commerce Commission.

"5. It should be made the duty of the Interstate Commerce Commission, in the exercise of its powers to fix reasonable rates, to so adjust these rates that they shall be just at once to the public and to the carriers. To that end, and as a means of properly safeguarding the credit of the carriers, of protecting the just rights of the owners and of providing a basis for additional facilities from time to time as the needs of commerce may require, the Interstate Commerce Commission should be required, in ascertaining and determining what is a reasonable rate for any service, to take into account and duly consider the value of the service, the rights of the passengers, shippers, and owners of the property transported; the expenses incident to the maintenance and operation of the carrier property; the rights and interests of the stockholders and creditors of the corporation; the necessity for the maintenance in the public service of efficient means of transportation and for the establishment from time to time of additional facilities and improved service; and, in addition thereto, any other consideration pertinent to be considered in arriving at a just conclusion.

"The power of the commission to suspend rates should be confined to 60 days from the date the tariff is filed. If the commission is not able within this time limit to reach a conclusion, the rate should, at the expiration of that time, be allowed to go into effect, with appropriate provision for reparation for a period not exceeding one year in case the rate should be subsequently declared to be unreasonably high.

"6. The Interstate Commerce Commission should be vested with the power, and it should be made its duty, to prescribe, upon the application of the postmaster general, or of any interested carrier, reasonable rates for all services and facilities connected with the carrying of the United States mails.

"7. There should be in the federal government the exclusive governmental power to supervise the issue of stocks and bonds by railroad carriers engaged in interstate and foreign commerce.

"8. The law should recognize the essential difference between things which restrain trade in the case of ordinary mercantile concerns and those which restrain trade in the case of common carriers.

"While the question of competition may be a fair criterion in the case of ordinary mercantile concerns, it is not a fair criterion in the case of common carriers. In the case of carriers the test should be: whether common ownership or control promotes trade and commerce by affording facilities for the interchange of traffic or by supplementing facilities for transportation, to a substantially greater extent than such common ownership or control restrains trade by suppressing competition.

"9. The law should expressly provide for the meeting and agreement of traffic or other officers of railroads in respect of rates or practices. This should, however, be safeguarded by requiring the agreements to be filed with the Interstate Commerce Commission and to be subject to be disapproved by it."

As to these suggestions, Mr. Thom said, the railways are practically in accord.

In beginning his statement Mr. Thom traced the history of railroad development and railroad regulation in the United States, outlining what the railroads regard as the defects and shortcomings in our present methods of regulation and the changes in the present policy which they believe must be adopted in order to assure to the public adequate transportation facilities.

REGULATION CORRECTIVE RATHER THAN CONSTRUCTIVE

He pointed out that the present system of governmental regulation of common carriers had its genesis in the abuses of the past and is based on the principles of repression, correction and punishment, rather than on constructive principles. He contrasted this with the spirit which has governed the plan of bank regulation, which, he said, "was born of a spirit of helpfulness and encouragement intended to build up and make adequate for the American people its system of national banks."

He referred to the conflict between the theory that railroads were private enterprises and the theory of the public character of the instrumentalities of commerce, saying that when the victory came, on the side of the public conception, it was "a victory won in anger, and the terms which were imposed were the terms of the victor upon the vanquished."

"We are confronted today," he said, "with the question whether it is possible to have that policy of correction the permanent policy of the government and whether the time has not come to introduce principles of encouragement, helpfulness and constructiveness into the system of regulation."

FIRST DUTY TO PUBLIC

The railroads accept the view that regulation is a permanent and enduring part of government in America, Mr. Thom said, and that the first duty of the carriers is to the public. That duty is to afford adequate facilities on reasonable terms and at reasonable rates and this must be done before any private interests can be considered. They ask that all their proposals be measured by the standard of public interest and appreciate that if any proposal fails to come up to this standard it must be discarded.

Mr. Thom contended that the real interest of the public is in being assured of certainty, safety and sufficiency of transportation facilities rather than in rates. The first consideration of the public is to obtain transportation facilities. What the cost is, is in reality a second consideration.

PRESENT FACILITIES INADEQUATE

This is illustrated, he said, by the sentiment of the country last summer, when it was menaced by the prospect of an entire suspension of transportation, when business men would have been willing to pay almost anything to get their goods to market. It is illustrated again by the present car shortage when the comfort and business of the public is seriously menaced by the failure to obtain cars. The present systems of regulation are entirely adequate to protect the public against

exorbitant rates but are not adequate to insure to the public sufficient facilities for its present and future requirements.

That there can be no reasonable contention that an adequate supply of transportation facilities is now assured the public, either for its present or future needs, he said, is illustrated by the embargoes placed last spring, largely due to inadequate terminals in some parts of the country, which laid their oppressive hand upon business to such an extent that Interstate Commerce Commissioner Clark put himself at the head of a committee of railroad men to try to work out the problems, and the difficulty is still unremedied because of the fundamental lack of facilities. It is also illustrated by the difficulty experienced in the handling of the large increase of business at the present time.

Mr. Thom proposed an increase of transportation facilities as a method of securing relief from the high cost of living, saying that less than 1,000 miles of new railroad has been constructed in the United States during the past year, less than any year since 1848, except the period of the Civil War, and yet the cost of living is daily advancing owing to a shortage of supplies which might be remedied by securing access to new areas of production.

As illustrating the inequality of transportation facilities at a time when new railroad building has nearly stopped, Mr. Thom showed that while New Jersey has 31 miles of railroad per 100 square miles of territory, the average for the United States is only 8.53 miles and in Idaho there are only 3.35 miles per 100 square miles. Pointing to a large map of Idaho, he showed the territory in that state containing a vast wealth of agricultural and mineral lands as yet untouched. Less than 33 per cent of the resources of the state now have railroad facilities, Mr. Thom said.

This leads us to the consideration, he said, as to whether railroad credit is as good as the public interest requires. It is impossible for railroads to earn enough to supply the necessary new facilities from current revenue. They must be provided from credit. Investors cannot be coerced but must be attracted.

Among the conditions affecting railroad credit which deter investors, he mentioned the following:

The European market for railroad securities is no longer available and after the war Europe will be a borrower rather than a lender of capital.

Railroad revenues are not controlled by investors but are fixed and limited by governmental authority, and not by one but by several governmental authorities, which do not recognize responsibility for assured results to investors and are entirely unco-ordinated.

Railroads cannot control and the government cannot and does not limit the expense account.

The present system of regulation is based on a policy of repression and correction and not on a policy of helpfulness and encouragement.

The outstanding obligations of the railroads have already exceeded the financial rule of safety and involve a disproportionate amount of obligations bearing fixed charges.

The investor must accept a sub-ordinate obligation or security with no assurance of a surplus of earnings to support it.

Other competitive lines of investment present superior attractions.

The railroad business is largely controlled by political instead of business considerations.

Those who oppose any change, he said, must make their appeal on the ground that the present system assures the public of the continued adequacy of transportation facilities. If they are not adequate, no argument based on the desirability of the present dual system of regulation will be accepted by public judgment. If the public is not assured of adequate railroad service the question of "states' right" is not involved, for such a situation would necessarily mean either larger and better

national regulation or government ownership. If the regulation of transportation facilities privately owned should fail, government ownership must follow and then all power of the states over the railroads would disappear.

Railroad credit is not alone a matter in which the owners of the railroads are interested, he said, because if the credit of the railroads breaks down or is insufficient, then the public is denied the opportunity of growth and expansion and of an avenue for the current of its commercial business. If railroad credit fails either the country will be blighted by an insufficient supply of railroad facilities or the government must take them over and supply the credit itself. If the government ever does become an operator of the railroads it will be because the public must take over the railroads in order to supply the credit.

THE LINE OF SAFETY

Mr. Thom pointed out that the business man who borrows all his capital is not considered a preferred risk and that a railroad can no more go on exhausting its assets by mortgages and loading itself up on the application of fixed charges than can the individual. There comes a point in railroad credit, he said, where the line of safety between the input of capital which can be borrowed and the input of capital which should be made by the owner of the property and be evidenced by stock without fixed charges is reached. The accumulation of fixed charges and the necessity of paying them constitutes a burden, if this line is exceeded, which may mean, in the end, default and bankruptcy.

A great many economists and financiers will say that the line of safety between debt and stock is at 50 per cent, Mr. Thom said, but he had heard of no contention that the proportion of borrowed money should be higher than 60 per cent. He pointed out that in 1900 the bonded indebtedness of the railroads of the United States was only 49.78 per cent of the entire capitalization; that in 1914 the percentage had grown to 61.80 and that in 1916, it is approximately 65 per cent.

In order that a railroad may finance itself by stock issues Mr. Thom said, it must have earnings sufficient to make the investors certain of a return of 6 per cent, with 3 per cent surplus. By this test 39 railroads, having a mileage of 47,363 miles could probably be financed by the issue of stock at par, while 137 railroads, having a mileage of 185,219 miles, could not be financed by the issue of stock at par.

Mr. Thom said he was not contending that gilt-edge railroad securities, such as first or prior liens, have no market, but that the problem is whether or not the railroads have margins of equity which they can use as the basis of getting new money into the enterprises. Railroad credit is reflected, he said, not in the quotations of the stock exchange, of bonds already in the hands of the public, but in the ability to market new securities.

THE BURDEN OF PROOF

The view held by some that the present situation of the carriers has been brought about by mismanagement and wrongdoing in the past totally ignores the needs of the public in the present and in the future. The public will not excuse inadequate transportation facilities now because someone tells them that the condition is the result of mistakes that may have been made in the past. The burden of proof is on the man who wants merely to look to the past to show that every need of commerce now and in the future will be supplied merely by the removal of abuses. The abuses have practically ceased and are no more prevalent in the railroad business today than in any other business humanly conducted. The great question now is whether the existing system of regulation gives the public reliable assurance of sufficient present and future railroad facilities. If not, it will be admitted that there must be such a change as will provide them.

STATE REGULATION A BURDEN TO COMMERCE

The financial needs of the railroads, the unjust burden imposed upon commerce by the existing dual system of state and federal regulation and the relation of states' rights to the federal control of railroad regulation were discussed by Mr. Thom, on the second day of his appearance before the committee.

"In our effort to ascertain what are the reasonable needs of the future," said Mr. Thom, "we have studied the growth of population, industries and commerce during the past 20 or more years, and the growth and development of railway traffic and of facilities and equipment during the same period. We have tried to show what the percentage of increase year by year has been during that period; how the property has grown; how the traffic has grown, and how the railroad facilities have grown to take care of it. The result is this,—from the growth of population, industries and commerce during this period, this has been found:

"First, that the wealth of this country has increased at the rate of eight to nine per cent per year, and that the same ratio of increase has held good in the demand for transportation.

"Second, that the forces that have operated in this growth and development in the past apparently continue still in full operation, and may reasonably be expected to so continue for the next 10 or 15 years.

"Third, the investment in railway facilities in order to meet the enlarged requirements of the future, because of this continued growth, and in order to fulfill the duties and obligation imposed upon the railways by the public, must also proceed at a corresponding annual rate of increase.

ROADS NEED \$1,500,000,000 A YEAR

"We take, then, eight per cent as the result of those figures, to indicate the annual growth that must be provided for in railroad facilities of all sorts, in order to keep up with the eight per cent of increase in the business of the country; and the result of that is that during the next 10 years there will be needed approximately \$1,250,000,000 a year, in order not to constrict the business and productive energies of the country, and in order to supply them reasonably with the facilities which this growing business will require. Those figures apply only to the amount that will be required to increase facilities; they do not include the amount that will be required to refund maturing debt. From the best information that we can obtain, there will be required to refund maturing debt during that time a sum approximating \$250,000,000 a year; so that the requirements of the railroads for new money during the period to which I allude are estimated by us to be \$1,500,000,000 a year.

"Is it not fair to ask of a system which limits revenue but does not limit expenses, where this money is to come from? Is it not fair to ask that in any constructive measure which is favored by the Congress of the United States, this essential need of the people shall not be overlooked and that some method shall be provided which will reasonably assure the necessary input of capital to bring and to keep these instrumentalities of commerce up to the requirements of public needs?"

PRESENT CONDITIONS OF REPEL CAPITAL

If conditions now imposed upon investments in railroads had existed in the early days, said Mr. Thom, does anyone suppose that our railroads would have been built by private enterprise? He cited government ownership as the only possible alternative to the establishment of conditions which will make it possible for the railroads to enjoy credit and earnings sufficient to meet the growing demands of the country. "The evils we now have are as nothing compared with those we would have under government ownership," he commented. "It is time to be careful."

Turning to the question of simplification of the system of regulation, Mr. Thom suggested that this should be considered from two viewpoints: the discouragement to the investor which this dual system creates and the effect of regulation by one state upon the interests of other states and upon interstate commerce.

"We all know," he said, "that the courts have been full of cases where state-made systems of rates have been attacked because the railroads regarded them as actually confiscatory in their character."

We all recognize the fact that the cases which have charged confiscation in this country have been almost entirely cases in regard to state-made systems of rates and seldom in regard to nation-made systems."

Calling attention to the fact that commerce had ceased to be a neighborhood affair, but was broader than states or nations even, Mr. Thom pointed out that railroad systems had come into existence in obedience to the law of commercial necessity, that they took no note of state lines, but joined the fields of production to markets and ports.

ECONOMIC LAWS WILL PREVAIL

"Any system of regulation of an economic question which throws itself athwart the path of economic progress," he continued, "is destined ultimately to failure. The logical operation of economic laws will prevail over human-made laws, and human intelligence, sooner or later, will begin to recognize it, and when it is recognized the adjustment that is made will be by the laws to the economic conditions, for it is impossible to adjust economic conditions to the laws."

Mr. Thom cited numerous cases in which the railroad laws or regulations of the various states injuriously affected the commerce of other states of the nation. "Between the Potomac and the Mississippi," he said, "there is not a state that does not make the state rates and the commerce of no two of the states moves on the same terms." He referred to the variation in state laws imposing penalties for failure to supply cars which cause the state imposing the heaviest penalty to be favored at the expense of others imposing smaller penalties or no penalties.

INTERFERENCE WITH SECURITY ISSUES

As an instance of one state imposing burdens on other states, he referred to the recent case in which the New York Central, with not over 150 miles of line in Illinois, was taxed \$600,000 by that state as a condition of its consent to the issue of certain securities and asked why the states of New York, Ohio, Indiana and the others through which the road runs could not with as much reason exercise the same right. "And if all had done it," he inquired, "what would have become of the possibility of making that financial transaction?"

As another illustration of the conflict of state laws, he mentioned the experience of the New York, New Haven and Hartford, which recently arranged for the sale of \$67,000,000 of convertible bonds, part of the issue to be used to refund maturing obligations and the balance of \$25,000,000 to be used to provide needed public facilities. The states of Rhode Island and Connecticut gave their approval, but while the Massachusetts commission approved the plan it was held that the laws of that state forbade their consent to it. The result was that the issue could not be made and the consequent inability of the road to furnish the proposed new facilities in the way of new equipment and enlarged terminals is largely responsible for the great congestion of business and interruption of commerce throughout the whole of New England and the surrounding regions.

"EXTRA CREW" LAWS COST \$1,700,000 A YEAR

The action of the states of Pennsylvania and New Jersey in passing "extra crew" laws was mentioned as a further ex-

ample of burdens imposed by state legislation upon the commerce of other states.

"The results of the action of New Jersey and Pennsylvania," said Mr. Thom, "is to impose an annual charge upon the railroads amounting to \$1,700,000 a year, which is interest at 5 per cent on \$34,000,000. The commerce of those states does not pay that charge. It pays only their proportion of it. The commerce of Ohio, Indiana and Illinois and of Delaware, Maryland and West Virginia is called upon to contribute."

"What justice is there in the commerce of these other states being burdened with that charge which they do not approve, to carry out a policy which they have not adopted, simply because some other state has adopted it? What soundness is there in the view that one state should thus possess the power of encumbering with charges the business of other states in order to carry out a policy in which those other states do not participate?"

"Should not such a power," he asked, "be lodged in the hands of the federal government which can act impartially toward all the states?" He pointed out that 19 states have the power of regulating securities issues, although the security issues apply to the whole line, not merely to the part located within a single state. In this way a railroad located in several states can be prevented from making a mortgage or issuing stock by the action of any one state. He also referred to the fact that a large issue of bonds proposed by the Southern Pacific, part of the proceeds of which was to be used for improvements in California, although approved by the California commission, was not approved by the state of Arizona, which withheld its consent unless a certain part of the proceeds should be expended in that state.

STATE DISCRIMINATIONS IN RATES

Attempts of states through rate regulation to discriminate against the commerce of other states were reviewed by Mr. Thom, who mentioned the Shreveport case, complaints made by Missouri of alleged discrimination by Illinois, of Tennessee against Arkansas and numerous other cases of a similar nature.

"Now is any system of jurisprudence sound which permits that result?" he asked. "Is any system of governmental regulation sound which puts at the mercy of one of the states the commercial policies and interests of every one of the other states, dependent upon the same carrier for facilities?"

Turning to the question of states' rights in relation to the national regulation of commerce, Mr. Thom showed that it was largely to insure free trade among the states and to prevent the erection of artificial barriers to trade as state boundaries that the original 13 states entered the Union. He elaborated the view that by union the states acquired certain rights which they considered more valuable than the rights they surrendered and that among these were the right to national defense, the right to a national post-office system, the right to a uniform system of tariff charges and the right to a uniform system of regulation of the instrumentalities of interstate commerce, which is no less important and valuable than the others mentioned.

STATE RIGHT TO UNIFORM REGULATION

"The power was given as an acquired right of each state," said Mr. Thom, "that its commercial policy should not be made by its neighbor, but should be controlled by the national authority, which should act impartially between the states, and which alone speak for all. So when I come to hear of a question of states' rights involved in this matter, I hasten to accept the comforting realization that the right which each state acquired by entering the Union, as high, as complete and as important as any other, is that the commerce of my state shall not be controlled by the different policy of a state across the border, but that I can come here where I

am in my father's house and where each one of your represent me as much as you represent any other section of the Union, and can plead for an impartial, a fair, a helpful and a comprehensive regulation of my commerce and expect to be answered with some just and equitable and comprehensive and equal system of regulation throughout the Union; where I am not dependent on what the people across the border may do in throwing burdens upon me, but where the burdens that come shall come from the representatives of us all, and be distributed with an equal hand among all the people of this country.

"Am I intruding upon any sacred rights of anybody by asking that? Am I disregarding any just power of anybody else when I ask that? Am I violating any constitutional right of anybody else when I ask for that? I feel that merely I am coming to the constitutional fountain of all our rights, and asking that a policy which shall apply to all, that shall affect all, that shall protect all, shall be the outcome of the universal judgment, and not of the judgment of a small fractional part.

"And when I make that request, I am not asking the disregard of a states' right; I am asking for the enforcement of a state right, and it seems to me that that issue should be decided, not by jealousy of the distribution of governmental power, but by the determination of the issue whether in the interest of all the people and all commerce, there should be a regulation by one central and all-comprehensive authority. It is manifest that the only way to exercise a complete and a protecting and a helpful regulation is to take hold of the instrument of interstate commerce. You cannot divide its business, you cannot leave one part of its business to somebody else's regulation and you regulate the other, because the influence of a regulation of any part may have destructive consequences upon the instrument of interstate commerce and the different states dependent upon the same interest may be most unfortunately and most hurtfully affected."

"My legal proposition," Mr. Thom said, "is that the constitution as it now is gives full authority to Congress to regulate the instrumentalities of interstate commerce in all their parts. If the power of regulation is to reach the public requirements, it must be co-extensive with the instrumentalities of commerce."

Mr. Thom explained that the roads are not asking either of the committee or of Congress any increase in revenues, but that they are merely asking the perfection of a system which will be responsive to any need that may arise.

MR. THOM QUESTIONED

Having completed his opening statement before the committee on November 25, Mr. Thom appeared before the committee on November 27 and was questioned by Chairman Newlands and Vice-Chairman Adamson concerning various details of the proposals of the railways.

Mr. Thom said that it was his idea that the states would reserve the right of taxation and the exercise of police power, in case the plan of federal incorporation should be adopted and that Congress should take over only those powers which it is essential for the national government to exercise in order to prevent interference with the rights of the states or with interstate commerce. While on the subject of taxation he said that the capital stock tax imposed in some states results in double taxation and acts on the same principle as taxing a farm and also the deed which represents the title to the property.

State control of rates, he said, results in placing an undue burden on the commerce of other states and on interstate commerce.

Chairman Newlands asked whether, if railways should be allowed to earn 6 per cent for dividends and 3 per cent for surplus, the dividends should be limited to 6 per cent. Mr.

Thom replied that dividends should not be limited unless the government were willing to guarantee them, saying that otherwise the investor would be taking the chance of losing everything without an offsetting opportunity of earning more than 6 per cent, and that he would prefer 6 per cent farm mortgages to such an investment.

Railway executives have only recently accepted the idea of federal incorporation with favor, Mr. Thom said, because some of them that operate under favorable state charters were reluctant to give them up. But he thought that federal incorporation should be made compulsory rather than that roads should be allowed to choose between state and federal charters.

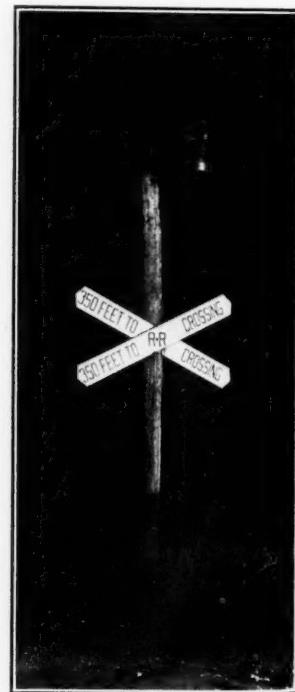
Asked whether it was thought that a plan of federal incorporation would facilitate the taking over of the roads by the government, he said that nothing was needed to facilitate such an operation if such a step were decided upon. He added that some railway executives "are leaning toward government ownership."

Chairman Newlands inserted in the record at the opening of the session, copies of various bills providing for federal incorporation which he has introduced in Congress since 1905.

At the conclusion of his address on Saturday Mr. Thom read to the committee a memorandum advocating federal incorporation, by Richard Olney, secretary of state under President Cleveland, who wrote that he was unable to appear personally before the committee.

ILLUMINATED CAUTIONARY HIGHWAY CROSSING SIGN

A correspondent, G. M., whose letter appears in another column—and who, by the way, is a well-known general manager—suggests that, with suitable landmarks, making plain to all travelers on the highway the exact location of railroad crossings, everything in the nature of automatic



Cautionary Highway Crossing Signal

signals, at such crossings, to announce the approach of trains could, with good reason, be done away with.

In this connection the reader will be interested in two photographs, herewith reproduced, which we have received from an officer of the Baltimore & Ohio. These pictures

show a sign which has been set up, recently, at a crossing on that road. The electric light which makes the sign visible at night stands out about 3 ft. from the post.

MECHANICAL DESIGN OF ELECTRIC LOCOMOTIVES*

By A. F. Batchelder

The purpose of this paper is to bring to the attention of the Society some of the important features in the mechanical design of electric locomotives, with a view of having a more common understanding of the requirements and the method of meeting them. These features may be listed in the order of their importance as follows:

- 1—Safety of operation
- 2—Adaptability to service conditions
- 3—Reliability in service
- 4—Convenience of arrangement as affecting safety and efficiency of operation
- 5—Power efficiency (affected by mechanical design)
- 6—Service time factor (ratio, time available for service to total time)
- 7—Cost maintenance of permanent way
- 8—Cost maintenance of locomotives
- 9—First Cost.

SAFETY OF OPERATION

The steam locomotive has been developed by degrees to such a state of perfection that it is common to see it operate at near 80 m. p. h. and with perfect safety; but no one would think of operating at this speed backwards. With the coming of the electric locomotive, the railroad operator is not content with single end operation, but must have a locomotive that will operate equally well in either direction. This does not impose any serious difficulties in the design of locomotives which operate at speeds under 50 m. p. h., but with locomotives for the higher speeds it presents new problems or at least it requires the most careful consideration of the running gear details, to obtain the most satisfactory results as to tracking and the effect on the rails and road bed.

The steam locomotive has what now seems to be natural characteristics to allow high speed operation in one direction. These characteristics are low center of gravity at the front end carried on the center pin of a two axle guiding truck, tending to prevent rolling over and having but little effect on the guiding, and high center of gravity on the rear end with inside journal bearings, allowing the locomotive to roll and increasing the time element, which thus reduces and distributes the lateral pressure against the rail over a longer distance. This increases the vertical pressure on the rail, thus holding it more firmly in place. These same characteristics can be obtained in electric locomotives by the sacrifice of double end operation.

The advantages gained in operating the electric locomotive in either direction are so important that means should be provided for satisfactory double end operation. One way of doing this is by using a four-wheel guiding truck at each end of the locomotive. With the use of the extra truck, however, the importance of a high center of gravity largely disappears. The lateral pressure against the rail at the rear end now appears at the truck flanges rather than at the flanges of the driving wheels and the high center of gravity no longer provides the same increased vertical pressure on the outer rail at the point of the maximum lateral pressure. The lateral stresses from guiding the main frame being taken at the center pin of the two guiding trucks, the additional vertical pressure on the outer rail is dependent upon the height of these center pins rather than upon the height of the center of gravity of the main frame above the wheel hubs, thus leaving less advantage to be derived from a high center of gravity.

To demonstrate more clearly, it is well to see what happens to a locomotive when entering a curve, which is also illustrative of its action on tangent track when oscillating from one side to the other. A locomotive having a high center of gravity and with two driving axles guided by a two-axle swivel truck will serve to illustrate the action. As the locomotive enters the curve, its tendency is to continue on in a straight line but the flange of the leading wheel gradually comes in contact with the outer rail, giving the guiding truck an angular motion about its outer rear wheel and exerting a lateral pressure against the center pin, thus giving the main frame an angular motion around its outer rear wheel.

The lateral pressure tending to displace the rail at the leading wheel is the amount required to slip the two inner wheels, and to accelerate the truck around its outer rear wheel, plus one-half the amount required to slip the two leading drivers and the rear inner driver, and to accelerate the main frame around its rear driving wheel, plus its relative portion of the centrifugal force of the whole locomotive. The lateral pressure tending to displace the outer rail at the rear wheel of the leading truck is the amount of reaction from slipping the two inner wheels and the angular acceleration of the truck plus one-half of the amount required to slip the two leading drivers and the rear inner driver and to accelerate the main frame around its rear outer driving wheel, plus its relative portion of the centrifugal force of the whole locomotive.

The lateral pressure tending to displace the outer rail at the rear wheel of the main frame is the amount of reaction from slipping the two leading drivers, the inner rear driver and the angular acceleration of the main frame plus its relative portion of the centrifugal force of the whole locomotive. The greater weight being concentrated at the drivers, and the distance of the truck center pin from the main truck wheels being greater, and the fact that there is but one wheel to take the strain, it follows that the point of the greatest concentrated lateral pressure is at the rear outer driving wheel.

The above disregards the important factor of time, in the accelerating and centrifugal forces due to the rolling, governed by the height of the center of gravity above the wheel hubs, which tends to reduce the lateral pressure at the rear outer driving wheel. With a high center of gravity above the wheel tread the accelerating and centrifugal forces also tend to tip the locomotive upon the outer driving wheels, relieving the weight from the inner wheels and thus lessening the force required to slip them, at the same time increasing the adhesion between the outer rail and tire by the additional weight. On good road bed and rails the locomotive described is capable of being run at above 80 m. p. h. without any apparent bad effect on the track.

If this locomotive is operated in the opposite direction, the lateral stress at these wheels are of the reverse order, the guiding force now being applied at the driving wheel flanges and the reaction taken through the center pin to the truck wheel flanges. The swivel truck, now trailing, is free to oscillate from one side to the other, and the reaction from the force of turning the main frame may be applied at the center pin when the truck wheel flanges are tight against the inner rail. The force is thus allowed to accelerate the truck as well as the main frame through the gage clearance to the outer rail, thus adding momentum, the value of which depends upon the lateral distance through which the truck is moved. As the vertical pressure on the rail is limited to the normal weight at the wheels plus the vertical component of the force applied only at the height of the center pin of the truck, the relative lateral to the vertical pressure at the wheels of the truck may be greatly increased. A number of observations have appeared to confirm the fact that the action of the trailing truck above described is one of the most

*Abstract of a paper which will be presented at the annual meeting of the Railroad Section of the American Society of Mechanical Engineers, held December 8, 1916, in New York.

important in producing excessive lateral pressures against the rail in a symmetrically built electric locomotive with similar trucks at both ends. It will be seen therefore that while the swivel truck is desirable as a guiding agent at the front end, it is not as desirable at the rear end, and means must be provided to prevent oscillation of the truck and to accomplish the same results as the high center of gravity in a single end locomotive.

To accomplish these results, it is necessary to reduce the momentum effect and to reproduce the equivalent of the time element factor and of the increase of vertical pressure on the outer rail that is characteristic of the high center of gravity single end locomotive.

The momentum effect can be reduced by introducing resistance against swivelling, thus restricting the truck from oscillating from one side of the track to the other, the amount of this resistance to be determined by the allowable amount that can safely be applied to the truck when leading. To reproduce the time element factor, lateral movement can be given to the truck center pin by any of the several methods for giving lateral movement to the leading truck center pins on locomotives. However, the writer has obtained the best results with the method that is the nearest to constant pressure and dead beat, as it also tends to prevent oscillating. To increase the vertical pressure on the outer rail the center bearing of the truck can be made wide, thus allowing the vertical component of the lateral pressure at the center of gravity to be transferred through the bearing to the wheel, or with the narrow center bearing the height may be made such that the lateral pressure at that point will result in an increased vertical component independent of the height of the center of gravity.

It is the writer's opinion that the double end locomotive, while its characteristics are different, can be designed for high speed with safety equal to the single end locomotive, and this regardless of the height of the center of gravity.

ADAPTABILITY TO SERVICE CONDITIONS

The electric locomotive, besides being required to operate in either direction, is often also required to be adapted for operating high speed passenger trains and heavy low speed freight trains over main line tracks, to negotiate sharp curves, and to be easy on light track and bridge structures. With locomotives having geared motors, the requirement of operating the passenger and freight trains can often be met by changing the gearing to obtain the proper speed and draw bar pull. The running gear can be made with trucks of short wheel base and coupled together, the number of trucks depending upon the required weight of the locomotive for its maximum draw bar pull, and also on the allowable weight per axle. With such a design curves of very short radius can be operated over and the weight per axle can be such as to allow operation over light structures.

RELIABILITY IN SERVICE

When the design is such that it is safe to operate at the required speeds and is proper for the curves and other service requirements, and a liberal factor of safety is provided for the parts subjected to strain, the reliability in service affected by the mechanical part of the locomotive depends mainly upon the bearings, their lubrication, and the method of power transmission from the motors to the drivers. It is necessary therefore to provide effective lubrication and as few bearings and as simple driving mechanism as the design of the motors will allow.

After providing all the safety appliances recommended by the Interstate Commerce Commission, it is important to arrange for the most convenient location of the operator to allow him an unobstructed view of the track and signals, to place within easy reach the air brake valve and locomotive signal device handles, as well as the reverser and power controller/handles, keeping in mind the importance of mak-

ing them so free from complication that the operator will require the least amount of thought to manipulate any of the devices and be free to respond to signals and look out for emergencies.

POWER EFFICIENCY

The power efficiency as affected by the mechanical design is governed largely by the type of the traction motors. It is apparent that the gearless motor mounted directly on the axle allows the design of the maximum efficiency on account of its few bearings and its absence of gearing and moving parts. The gearless motor which is mounted on a quill and driving through springs to the wheels may be considered second in its possibilities for high efficiency design, it having additional bearings and a greater number of moving parts. The single reduction geared motor with its additional bearings and gear losses can be given third place in its possibilities for high efficiency design. The single reduction geared motor driving through gears and side rods to the wheels may be placed fourth. The gearless motor driving through side rods and jack shaft to the wheels should be placed fifth.

SERVICE TIME FACTOR

The service time factor is dependent upon the ability of the locomotive to operate under all its service conditions and without undue strains which requires a liberal design of its wearing parts. In addition to this it depends on the simplicity of its design and the ease with which its parts can be inspected, adjusted, repaired, or replaced.

COST OF MAINTENANCE OF PERMANENT WAY

The cost of maintenance of the permanent way is a very important item and can be increased or reduced by the design of the locomotive. The lowest cost is obtained when the locomotive meets its service requirements without undue strains, when the rotating parts are balanced, the weights per axle are suitable for the structures, a suitable equalizing system is provided to maintain the proper weight distribution, and when provision is made to protect against flange wear.

COST OF MAINTENANCE OF LOCOMOTIVES

The cost of maintenance of the locomotive is dependent upon its safety of operation, its adaptability to service conditions, its reliability, its convenience of arrangement, and the same items that enter into its service time factor. It is also governed by the same conditions as affect the maintenance of the permanent way. The care with which the material is selected, the quality of workmanship, the ease with which the parts can be inspected, adjusted, repaired or replaced, and the simplicity of the design are the most important features that govern the maintenance cost.

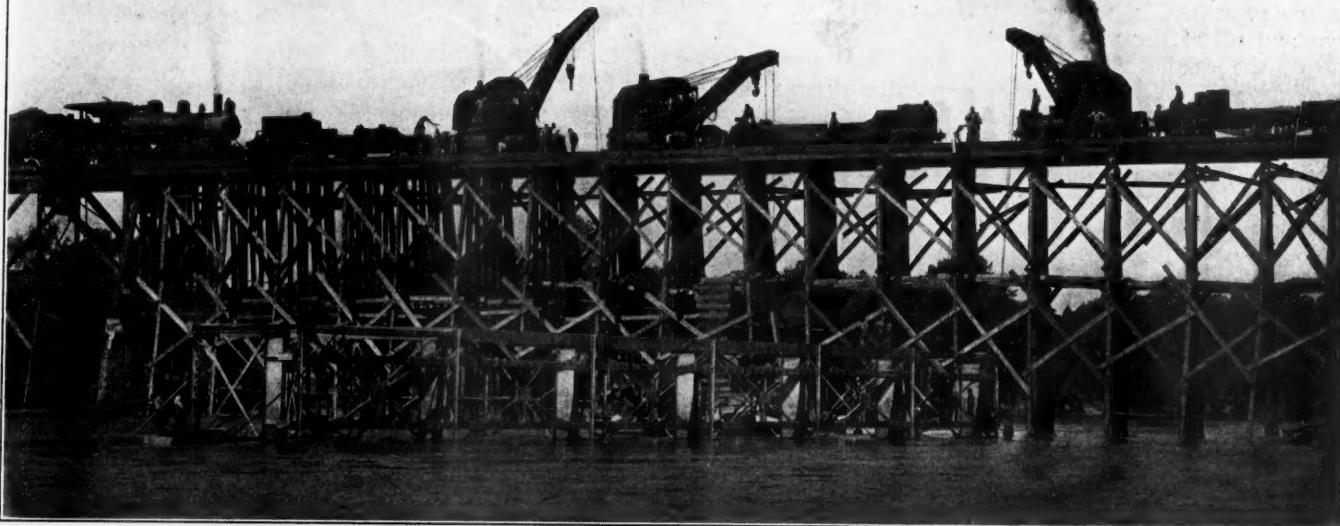
FIRST COST

The first cost of a locomotive will depend largely upon the design chosen, but its importance, except at the time of purchase, becomes of little moment when taking into consideration the eight foregoing features. With two locomotives designed for the same service the cost of the difference in the efficiency and in the locomotive maintenance alone for one year may when capitalized amount to a sum representing a considerable proportion of the first cost of one of the locomotives.

The writer feels that too much importance cannot be given to developing to the utmost the mechanical parts of the electric locomotive that are the simplest in design and the highest in efficiency. From the present outlook, the locomotive for high speed passenger service with the gearless motor, its armature being mounted directly on the axle, and the locomotive for freight and switching service with the single reduction geared motor, mounted on and geared to the axle, lend themselves best to simple design and low cost of maintenance.

Repairing Flood Damage on the Southern

Excellent Esprit de Corps Displayed in Restoring Traffic
on Lines Destroyed by Storms of Unprecedented Severity



Replacing Spans, Catawba River Bridge—Columbia Division

THE operating, maintenance and construction forces of the Southern were severely tried during the last four months in restoring to traffic and proper operating condition the lines of the system which suffered severe damage as the result of two storms occurring in rapid succession during the summer. About 680 miles of line in North Carolina, South Carolina and Tennessee were put out of service, causing a loss estimated at approximately \$1,250,000. This does not include the loss of traffic, the cost of detouring trains, or the extensive permanent work now in progress to replace the temporary structures, built rapidly to restore traffic. By the strenuous efforts of the Southern's forces, working in many cases as independent units, isolated by the flood, most of the lines were restored to traffic in a little more than a week, although one line, that between Salisbury and Asheville, was out of service for nearly six weeks.

The principal damage occurred in North Carolina, following a storm that raged on July 15 and 16, but an earlier storm, which struck Mobile, Ala., on July 5, and spread northward over the state in the shape of a fan, caused washouts and inundations of the various lines, and resulted in considerable interruption of traffic. At Mobile the Southern's dock property suffered injury to the extent of \$75,000.

Traffic had hardly been restored after the earlier storm when a second one originating in the Caribbean Sea struck Charleston, S. C., on the morning of July 14, passing northwest across South Carolina and western North Carolina. It reached the Blue Ridge mountains about noon of the 15th, but unlike most storms of the same character, which turn to the north and northeast into Virginia and the North Atlantic states, this storm was delayed by a high pressure condition in the north-eastern states, with the result that it practically exhausted itself in a limited area on the eastern foothills and crest of the Blue Ridge. Here the rainfall was enormous. In a territory having roughly the shape of an ellipse, 80 miles long and 30 miles wide, lying just northwest of the towns of Asheville, Morganton and Wilkesboro in North Carolina, 15 inches of rain fell on July 15 and 16, most of it within 24 hours. Within this ellipse is a smaller one 40 miles long and 15 miles wide, in which the rainfall was in excess of 20 inches for the same period. At Altapass,

in the Blue Ridge, a fall of 22.22 in. was recorded for a 24-hour period, the greatest ever reported in the United States for an equal length of time.

The results of the heavy downfall were aggravated by the fact that much of the territory covered had been subjected to local rains for a period of seven to nine days preceding this storm. In consequence, the ground was saturated and the streams were bank-full when the storm broke. The rain continued almost uninterruptedly for nearly two weeks after the storm, thereby interfering seriously with the work of restoration. At Altapass, where the record rainfall took place, some rain fell on each of 18 successive days.

The area of high rainfall, as described above, embraces the head waters of the Yadkin, Catawba and Broad rivers, which flow in a generally southeasterly direction across the coastal plane to the Atlantic ocean. Much of the damage was the result of flood conditions in these streams and their tributaries. The Catawba river carried out nine railway bridges and all of the highway bridges which cross it. The Southern, having a network of lines in the direct path of the storm and crossing these streams repeatedly, suffered more severely than any other railroad in the affected district.

The flood discharge of many of these streams was entirely beyond any previous record, as indicated by the following quotation from the Climatological Data for July, 1916: "At Asheville the French Broad river reached a stage of 18.6 ft. at 9 a. m. of the 16th, or 8 ft. above the previous high record; by 10 a. m. the bridge to which the river gage was attached was swept away and the water continued to rise until 1 p. m., reaching an estimated stage of 21.0 ft., or 10.4 ft. above the record flood. The Catawba river at Mount Holly reached a stage of 45.5 ft. on the morning of the 17th, or nearly double the 1901 record, the bridge to which the gage was attached being also washed away. The upper waters of the Yadkin were the highest ever observed."

LINE CUT IN MANY PLACES

Four bridges of the Southern over the Catawba river were carried out—at Catawba on the Salisbury-Asheville line, at Belmont on the Charlotte-Spartanburg line, at Catawba river on the Charlotte-Columbia line, and at Wateree on a

branch of the Charleston division. The Broad river wrought destruction at many points on the Spartanburg-Columbia line which it parallels for a distance of 40 miles, while the line from Columbia to Branchville, in the direction of Charleston, was put out of service by general inundations. Smaller streams caused repeated washouts between Spartanburg and Asheville. The French Broad river flowing northeast on the other side of the Blue Ridge watershed caused heavy damage at Asheville, where it flooded a large part of the town and all of the railway property and washed out the line of the Southern between Asheville and Morristown, which follows its course as far as Rankin, a distance of 67 miles. In a similar manner the Yadkin river destroyed 61 miles of the line between Wilkesboro and Greensboro.

The greatest damage, however, was done to the Salisbury-Asheville line, a large part of which lies within or just outside of the area of the extreme rainfall. Aside from the break caused by the loss of the Catawba river bridge, the damage to this line was caused by the heavy flood discharges of the smaller streams, and to a large extent by the direct effect of the extreme rainfall. There were many landslides closing up the mouths of tunnels, choking up cuts and carrying away embankments. A mica bearing schist abounds in this region, and although stable enough while dry, it assumes a semi-liquid state when wet and causes untold trouble.

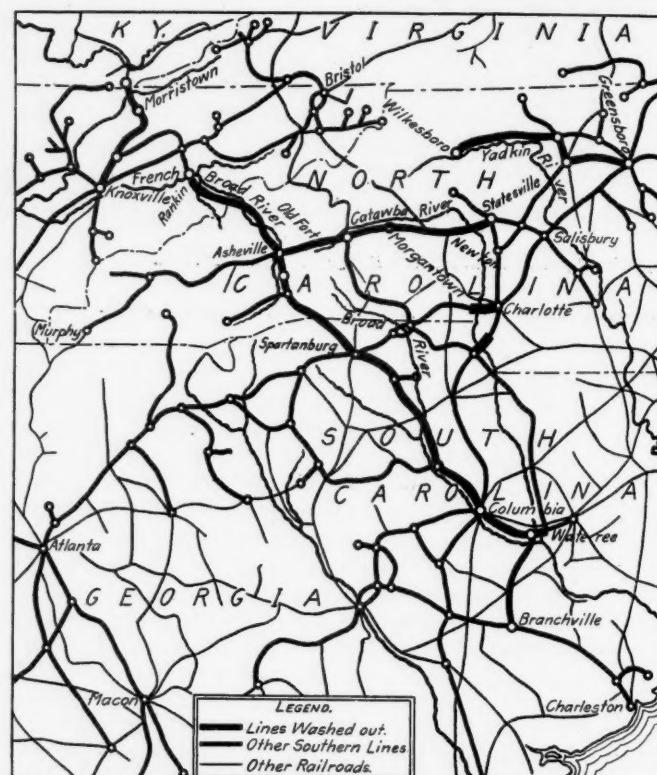
Although there had been some warning of the storm, and certain preparatory measures were taken before the damage was actually done, there was insufficient time for organized preparation. After the troubles had commenced rail communication and to a large extent also telegraphic communication were interrupted, and each fragment of the operating, maintenance and construction organizations was compelled to carry on its portion of the restoration work as an independent unit with such equipment, tools and materials as were in stock or could be purchased locally. After some of the lines had been restored large quantities of supplies, which had been gathered in the meantime, were shipped in all possible haste to the points where needed. Much of this material was ordered by telegraph and shipped on special trains, and some very quick deliveries were made. An order was placed by telephone in Pittsburgh for 900 kegs of spikes, 200 kegs of boat spikes, and 400 kegs of nails, which were shipped by special train on the same day. A 90,000-gal. water tank which was ordered from Batavia, Ill., on July 20, was shipped on July 25, and was erected by the time the track was restored. The more common points of shipment were Norfolk, Richmond, Atlanta, Chattanooga, Louisville and Baltimore, although an order for pumps was placed as far west as Dubuque, Iowa. The following partial list gives some idea of the equipment that was shipped into the affected district on short notice: 300 gas torches, 3 carloads of explosives, 8 Milburn lights, 50 drag scrapers, 700 wheelbarrows, 8 carloads of steel sheet piling, 2,000 tons of new rails, 500 tons of relay rails, 6,346 piles, 6,350,000 ft. of lumber and 65 carloads of concrete pipe.

THE ASHEVILLE-SALISBURY LINE

The line most severely devastated and most completely isolated was the Asheville-Salisbury line running west from the Catawba river. It was the last line to be restored. The first train passed through on August 20, the passenger schedule being restored a week later. This line traverses a difficult country, crossing the Blue Ridge at Ridgecrest, making the east approach along Mill creek, a tributary to the Catawba river, and the west approach along a branch of the French Broad river. Of the 115 miles of this line between Statesville and Asheville only the 20 miles from Newton to Connelly Springs was intact. Between Old Fort and Asheville, a distance of 30 miles, there was not more than one-half mile of continuous track. Thus, in addition to the

blocking of the line by the destruction of the Catawba river bridge, the principal damage to this line was at its western or mountain end. In consequence the major portion of the line was entirely isolated, making it necessary to carry on most of the repair work without outside assistance. The line was without communication with the rest of the system for a period of three weeks.

The homes and property of the inhabitants were so severely damaged by the storm that the people were largely in a dazed and helpless condition, and, with highways as well as the railroads destroyed, there was a limited food supply in many sections, resulting in some suffering before steps could be taken to prevent it. It was necessary for the railroad organization to assume control of the situation, taking advantage of whatever local resources the country afforded in order to carry on the work. Whatever materials were found in cars that had been marooned within the affected district, such as food, building material, tools, and the like, were commandeered for the use of the restoration forces.



Map of the Affected District

Requisitions were placed on all hardware, grocery or general stores within the district for whatever could be had. Cash was paid for everything purchased. The lack of adequate tools offered a serious handicap to the work. After the stores had been exhausted scouts were sent out through the country to bring in axes, kitchen hatchets, shovels, or any other utensils that could be used to equip the working forces. Local lumber mills were set at work as soon as possible cutting lumber of all kinds needed.

The working force was necessarily recruited locally. Employment was facilitated to a certain extent by the scarcity of the food supply. Men were anxious to get on the rolls in order to be admitted to the camps. As many as 2,000 men were employed on this line at one time. This force made the shelter and feeding of the men a problem by itself. Owing to the fact that only a limited number of cars were available, it was necessary to provide temporary buildings to house a large portion of the men. This required quick work. A camp at Dendron, near Old Fort, equipped to care for 700 men, was completed in four days. Another at Old Fort was



Destruction of Embankment Isolated Bridge
Debris Stopped by Southern Bridge at Asheville
Cut Blocked by Slide

Debris Left by the Flood
Track Spanning Break in Fill
Mouth of Tunnel Choked by Debris

provided to house 600 men in cars and temporary buildings. Four other smaller camps were also provided. Special attention was given to secure maximum comfort and good sanitation, and as a result of these measures there were only 13 cases of contagious diseases during the course of the entire work. Special attention was given to the water, all of which was boiled before it was used. The camps had to be placed close together, owing to a lack of a sufficient number of hand cars or motor cars to carry the men to and from the work. The camp at Dendron, however, was particularly advantageous in this respect, being located about six miles east of the summit, where the development of the elevation is made by a series of loops in close proximity.

Transportation proved a difficult problem. Rolling equipment included only that of the trains which had been marooned within the flooded district. A 32-ton geared engine belonging to the Kistler Tanning Co., at Morganton, N. C., and loaned to the railroad proved a valuable addition to the equipment. Some 60 miles of highway and trails were repaired, built new or re-located to move material in advance of the track restoration. At one time a force of 90 wagons were in service between Marion and Old Fort.

The repair work was carried on principally by hand labor. Tunnels and cuts were cleaned out by hand. In some cases it was necessary to go high up on the hillsides and remove the overburden that was slipping into the cuts in its water-soaked condition. Subsided or washed-out embankments were overcome by building trestles or changing the line sufficient to permit of side hill locations that would entail the least amount of earth work. In some cases a sag was placed in the grade line, such that the embankment would temporarily afford a sufficient width to place the track. Work is now in progress replacing masonry culverts, steel and concrete bridges that were carried out and where frame or pile trestles are now serving temporarily, and in rebuilding embankments on the correct alinement, where run-arounds or shoo-flies are now being used.

RESTORATION OF THE OTHER LINES

Asheville served as one center from which the repair work was directed. Extensive damage was done at this place, although the new reinforced concrete bridge of the Southern withstood the flood, and, acting as a dam, saved a number of other structures from destruction. Asheville was isolated from railroad communication, except by means of the Murphy branch of the Southern, which lies west of the Blue Ridge and was out of the path of the storm. By its connection with the Louisville & Nashville at Murphy this line served as a single circuitous route for the delivery of supplies and equipment.

Pile drivers and crews from other roads came in over this route. Damage east of Asheville was done principally on the 16th. Forces were sent in that direction first, encountering the first serious break at Arden, where the embankment was side washed for a distance of 800 ft. At Blake's Pond the track was washed off the roadway for a distance of 500 ft. At Melrose the bridge over the Pacolet river was washed out.

The damage between Asheville and Rankin along the French Broad river was not done for some hours after the greatest destruction had taken place east of Asheville. Advantage was taken of this delay to bring a pile driver from Knoxville to Asheville on July 16, the special train being the last one to pass over this line for two weeks. The French Broad river line suffered principally from side wash, as stated above, and as the embankment was not high as a rule it was not difficult to restore the line, although the extent of the damage was considerable. A large amount of chatts secured from the Mascot zinc mills proved of great help in the repair work, from 50 to 75 cars of this material being used daily for a considerable period.

On the main line between Charlotte and Spartanburg ef-

forts were directed principally to the replacing of the Catawba river bridge at Belmont, a deck structure consisting of 3 deck truss spans of about 150 ft. and five deck girder spans on high piers. The superstructure was carried away, save one span, with the loss of the lives of eight employees who were on the bridge at the time. All of the substructure was destroyed except an abutment and one concrete pier, while 250 ft. of embankment at each end of the bridge was washed away. On the south end the embankment was restored by a steam shovel and dump cars, while at the north end it was leveled down and the gap was closed with a pile driver. The bridge opening was closed by driving piles with track drivers working from each end with a third driver that was hoisted piecemeal and erected on top of the remaining standing span.

On the Columbia-Charlotte line the forces were engaged principally in securing a crossing of the Catawba river where the bridge was carried out at Catawba River. This consisted of nine spans of 125 ft. deck trusses, eight of which were washed away. Two of the accompanying photographs show the conditions before the work of restoration had been started, and the manner in which the temporary repairs were made. Three Bucyrus derricks dragged the spans from the positions to which they had been washed to a location alongside the bridge where they were raised up on crib work to the final elevation.

An interesting commentary on the flood damage is that no all-concrete structure was destroyed, although many ashlar masonry bridge piers and abutments, like those shown in some of the pictures, suffered a gradual or piecemeal disintegration, one stone after another being carried away. As the concrete piers were monolithic they did not afford this opportunity for the action of the flood and drift. This particular phenomenon was noted also in culverts. Many stone masonry culverts were destroyed by washing out progressively from the downstream end, but no concrete culverts failed in this manner, and in several cases where old stone culverts had been extended at the end to permit the widening of embankments or the raising of the grades, these concrete ends were the only portions remaining.

WASHINGTON CORRESPONDENCE

WASHINGTON, D. C., November 28, 1916.

EIGHT-HOUR LAW TEST CASE SELECTED

Attorneys for the government and for the railroads having reached an agreement that the issues involved in the Adamson law shall be submitted to the Supreme Court in a test case, it is expected that the appeal from the decision of Judge Hook of Kansas City will be taken up by the Supreme Court when it reconvenes on Monday, December 4. On that date counsel for both sides will ask that an early date be set for argument. After negotiations between the government and railroad attorneys, both in Washington and at Kansas City, a stipulation has been signed selecting the case of the Missouri, Oklahoma & Gulf, in which Judge Hook gave a decision that the law is unconstitutional, for the test.

The objection raised by the railroad lawyers that the issues presented in the Missouri, Oklahoma & Gulf case might not afford a proper test because the road is a short line, having only 334 miles of trackage, and does not present the complicated situation as to wage schedules which prevails on a large railroad system, has been met by a provision in the stipulation that the railroads may also present the wage schedules of other companies which they may deem necessary to illustrate the provisions of the act.

There has been a suspicion in Washington that the selection of the Missouri, Oklahoma & Gulf case by the department of justice was in some way connected with the visit of the brotherhood leaders to the attorney general's office last week. The government's motion for an immediate decision in this case was filed in the court at Kansas City last week

Tuesday, on the day after the conference with the brotherhood leaders, and at about the same time that a committee of railroad lawyers, A. H. Harris, vice-president and general counsel of the New York Central, Chester M. Dawes, general counsel of the Chicago, Burlington & Quincy, and Francis I. Gowen, general counsel of the Pennsylvania, called at the office of the attorney general, in entire ignorance of the steps already taken by the department of justice, to see if a test case could be arranged. The railroad lawyers had expected that the case of the Atchison, Topeka & Santa Fe, which had been set for hearing at Kansas City on November 23, or that of one of the other larger roads, would be selected, but after several conferences an agreement was reached and was immediately wired to the attorney general's assistants in Kansas City. The Santa Fe and Union Pacific cases were then postponed and an agreement was signed providing for making use of the wage schedules of other roads where the facts in the Missouri, Oklahoma & Gulf case are not sufficiently illustrative.

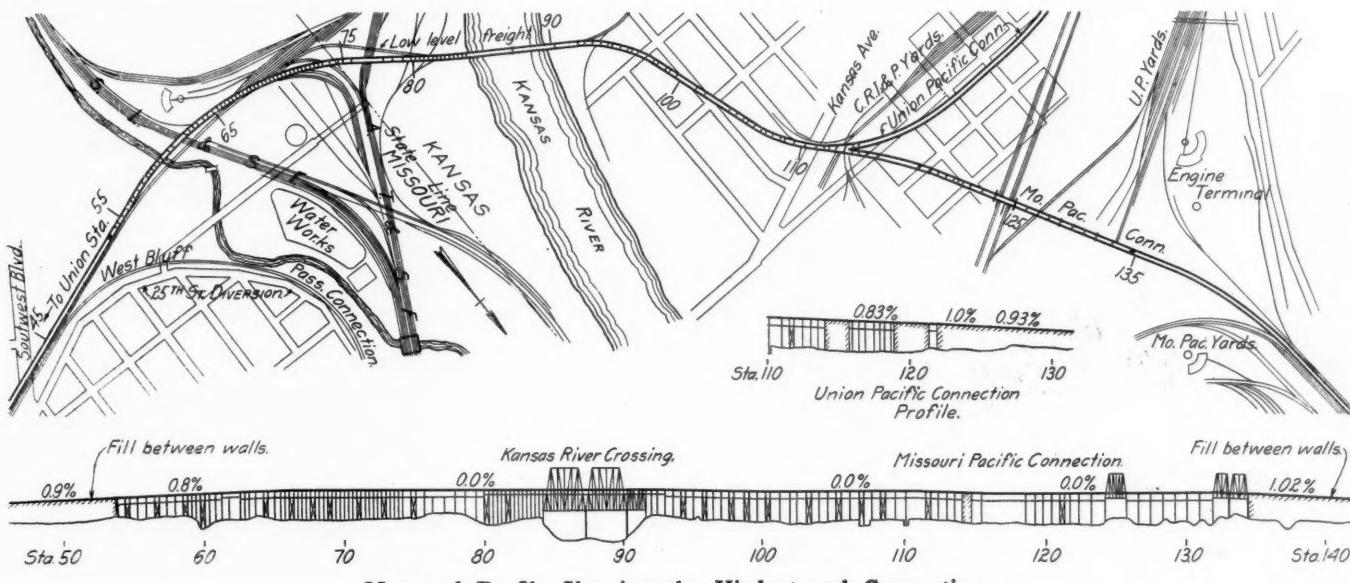
A statement issued by Walker D. Hines, chairman of the committee of the railroad counsel, says that the main allegations of the bill in the test case as to grounds of attack and as to general facts are identical with the main allegations in the bills filed by the railroad companies generally. The agreement provides for postponement of the injunction suits filed by other railroads in various courts and the department of justice agrees not to institute prosecutions under the law before the determination of the test case. The stipulation also includes a provision that books and accounts shall be kept in such manner that if the act is upheld the amounts due the employees under the court's construction of the act

prevent a recurrence of the situation which existed last August in spite of the disapproval of such a plan which has been plainly manifested both by the brotherhoods and the American Federation of Labor.

In his opening statement before the Newlands Joint Committee on Interstate Commerce, in which he outlined the proposals of the railways for changes in the methods of railway regulation, Alfred P. Thom, counsel for the Railway Executives' Advisory Committee, made no suggestions on the labor question. He told the committee that all of the proposals which he had outlined were agreed upon by the railroads before the labor situation became such a menace to the commerce of the country. "When we prepared for these hearings," he said, "we did not expect to introduce that subject, notwithstanding its importance, because of its hotly contested character. It may be that recent events have put the labor controversy in such a situation that Congress will have to confront it and to deal with it. Whether that will be done by this committee or by some other committee of Congress we are not advised. Therefore, for the present I shall make no suggestions in respect to the labor situation because it seems to me that that situation ought to be met when it arises and with proper opportunity for exchange of views in regard to various proposals."

NEW KANSAS CITY TERMINAL VIADUCT

With the recent letting of a contract for the construction and the ordering of 25,000 tons of steel, the Kansas City Terminal Railway has undertaken the building of a double track, double deck bridge and a double track approach via-



Map and Profile Showing the Viaduct and Connections

may be ascertained and paid. This is not only in accordance with the suggestions of Judge Hook, but with the position taken by the railroads from the outset and the wishes of the department of justice.

The principal question in the case now is as to how soon the Supreme Court may be able to pass upon the case. The department of justice is said to hold the opinion that a decision may be obtained before January 1.

President Wilson's message to Congress to be presented next Tuesday has been printed and it is the understanding that it contains a reiteration of the recommendation he made in his message of last August for an amendment to the Newlands arbitration law to prohibit strikes until after there has been public investigation of the issues involved. It is said that the President intends to insist that the Adamson law shall be supplemented by some such legislation in order to

duct across the Kaw river and bottoms to afford a more convenient entrance to the new Union Station for roads from the North and West. These roads include the Union Pacific, the Chicago, Rock Island and Pacific (from the west), the Missouri Pacific (from the north) and the Chicago Great Western, all of which are now required to pass through the industrial district and the network of tracks in the Kaw river bottoms at grade.

The new structure will consist of an approach embankment 983 ft. long held between retaining walls, a double track steel viaduct 2,989 ft. long, the Kaw river bridge 743 ft. long and a viaduct 4,280 ft. long with an approach embankment at the west end 3,760 ft. long.

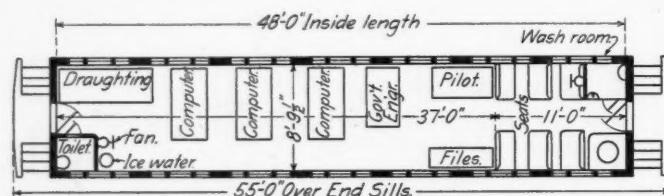
The viaduct will consist of standard double track deck plate girder construction designed for Coopers E-60 loading, while the river crossing will consist of two 300 ft. pin-con-

nected spans and a 132 ft. riveted span. This structure has been designed for Coopers E-80 loading, using 25 per cent increase of unit stresses. The tracks on the lower level will be for freight service while those on the upper level will be used by passenger trains and will connect with tracks leading direct to the passenger station.

This structure has been designed and will be built under the direction of John V. Hanna, chief engineer and George E. Tebbetts, bridge engineer of the Kansas City Terminal Railway.

A CAR FOR A VALUATION PARTY

The photograph and drawing illustrate a passenger car which has been remodeled for use as an office car by a party engaged in making the valuation of the Bessemer & Lake Erie. As will be noted from the illustrations the seats have



Plan of the Arrangement

been removed from the car except at one end and have been replaced by desks for the use of the pilot, the Government engineer and the computers. The members of this party are provided with a convenient permanent office, which is at the same time portable as the car can be moved from place to



Interior of the Valuation Car

place with the progress of the work. It is lighted with both oil and electric lights. The parcel racks have been left in place to provide storage for papers, while a filing case is also provided in one corner of the car.

CHANGE IN NAME OF RUSSIAN PORT.—The name of the new Russian town and ice-free port at the terminus of the Murman Railway has been changed from Port Murman to Romanoff-on-Murman.

THE TRAIN DESPATCHER AND SAFETY FIRST

By J. L. Coss

With all that has been written and all the money that has been spent in teaching "Safety First," during the past five years, I have yet to see anything on the subject in connection with the train despatcher or his surroundings. If there is any place on the railroad where Safety First should prevail in all its phases it certainly is in the despatcher's office, where a blunder might cost many lives and thousands of dollars' worth of property.

In the first place, the location and surroundings of the office should be taken into consideration. The surgical fraternity would hesitate to locate a hospital in close proximity to a boiler shop. If the despatcher's office is located near the yard, or in the yard, where switch engines are drilling all day and throughout the night, blowing off steam and whistling, it stands to reason that there is more liability of mistakes than in a quiet office, and more especially where the telephone is used, and at times (summer) when the windows of the office must be kept open.

Where clerks are allowed to go into the despatcher's office and paw over the train sheets while on the despatcher's table, in search of some bit of information—as to when a train or an engineman will be in, because some of his folks called up on the telephone, or to fill in an item on some report—it will, beyond question, distract the despatcher's attention from his duties. There is no report so important that it cannot be withheld until the sheets have served their purpose on the despatcher's desk.

It will be conceded by any experienced railroad officer that the most dangerous time in the despatcher's office during the twenty-four hour period is that when the despatchers are making the transfer from one to the other. At this very hour it seems to be the custom of some chief despatchers to become particularly interested in the crews and engines; and to commence to check the sheets on the despatcher's table. They want to use the old sheet for a while and to question the outgoing man as to what he knows about this, that and the other. With all this uproar going on at the time of transfer there is a chance that the outgoing man may fail to apprise his relief of some point concerning an important order; and all because they were not left undisturbed during the transfer.

Telephone conversations should never be permitted on the despatcher's wire, under any circumstances, unless entirely impossible to use the regular wire; but it seems as though at the transfer period there is always some one or more who want to talk. Every one—operators, agents and officers—should bear in mind the transfer periods and remember that such are critical times; hold off a few minutes unless it is necessary to speak about something connected with the movement of a train.

Another bad practice is that of the fellow who enters the office abruptly and squalls out something at the despatcher; who, at that particular moment may be checking a wait or a meet order. A mistake would result in a disaster. With the telegraph wire, it is possible to partly carry on a conversation and know what the sounder is saying, but not so with the telephone.

When carpenters have to repair the despatcher's office the men should be moved to other quarters. The noise will interfere with their work and it is a strain on the mind to try to work under such conditions.

When the chief despatcher finds it absolutely necessary to ask something of the trick man, the question should be noted on a piece of paper and laid before him on the desk, instead of calling to him about it. No employee would think of rushing into the superintendent's private office and calling out something in a loud voice; the despatcher's office demands the same respect.

New Influences Affecting Passenger Traffic*

The Automobile Successfully Competing With Railway
Service Uses Roads Railway Taxation Helps to Pay For

By Samuel M. Felton
President of the Chicago Great Western

BEFORE our day the railways had to meet and overcome the stage coach, the canal and the steamboat. Today the first named is to be found only in museums. The state of New York has invested over a hundred million dollars in an attempt to make the old Erie canal an efficient competitor of the New York Central and other railway lines between Buffalo and New York. The activities of the steamboat are largely confined to the Great Lakes, the Sound and our two ocean coasts, with the aid of the Panama Canal. I presume we will always have the canal with us, barring a slide now and then.

About twenty years ago, the railways found themselves confronted with a new competitor in the suburban electric railways. No sooner had these children of electricity relegated the horse car to the scrap-heap than they began extending their field of operations in every direction from the great cities and in connecting up the smaller towns. In 1890 less than one-sixth of all street railways were operated by electrical power. In 1912 over 41,000 miles were so operated. In 1902, the revenues of the electric railways were less than \$250,000,000; in 1912 they were more than \$567,000,000, an increase of nearly 130 per cent. In the meantime the passenger revenues of the railways increased but 67 per cent. It is, of course, impossible to tell how much steam railway passenger travel was diverted to the electric, but with the latter paralleling the former wherever the density of population invites, coupling all the large cities with the smaller ones in their vicinity, with the gradual improvement of electric cars, in size, speed and conveniences, to the standard of steam passenger cars, it is a conservative guess that in 1916 the loss of the steam railways to the electrics was over \$100,000,000. And this was clear loss, for the steam railways have maintained a service more than equal to handling the greater traffic.

The direct effect of this electric railway competition is shown in the increase in the average journey per passenger from 24.06 miles in 1890 to 33.6 miles in 1915. Remember that as the density of population increases, the tendency is all the other way. Between the same years, the average journey in Interstate Commerce Commission Group II, which includes New York, New Jersey and Pennsylvania, increased from 16.73 to 24 miles, or 43.45 per cent. This tells the story of a wholesale transfer of the short, or commuter, haul from the steam to the electric railways.

But the latest Richmond to appear in the field promises to be a more universal and troublesome customer to deal with. No fixed rails have to be laid and paid for to contract its sphere of operations. It has no charge for maintenance of way and structures. Anyone with the price of a Henry Ford a few gallons of gasoline in his blue jeans can enter the lists with the most costly twelve car Pullman train in the land. The whole vast continent affords the field for its operations. It multiplies its numbers, adaptability and efficiency, and reduces its initial cost in a night and no man can place a limit on the sphere of its usefulness. It is free to pick up its owner or its passenger at any place and hour, and bear him whither he would go—not quite as straight as the crow flies, but almost as rapidly and surely as the rabbit runs.

You have only to stand on the corner of any main thor-

oughfare leading into our great cities to see a procession of possible railway passengers numbering in the thousands going in and out every night and morning. At a point eight miles from the City Hall in Chicago these automobiles flit by for two hours night and morning at the rate of over a hundred a minute at an average speed of twenty to twenty-five miles an hour. Is it any wonder that between a parallel trolley line and automobile competition the Chicago & North Western, which formerly had a monopoly of the Chicago north-shore passenger traffic, should see its average passenger journey lengthened from about 27 to 35 miles during the last 16 years?

But automobile competition is not confined to the suburban traffic. There seems to be no limit on the touring range of the automobile. There were something like 50,000 visiting automobiles registered in the state of Massachusetts last summer. Now no one can tell within approximate figures how this affected the passenger revenues of the New England roads. It probably cut into the receipts of the electric lines as well.

However, there is one barometer by which we can arrive at some idea of the effect of this competition on railway passenger revenues. During the seven years 1907 to 1914, in the face of active trolley competition, the passenger revenues increased at the rate of over 3 per cent per annum. We know that passenger revenues respond more quickly than freight revenues to any general prosperity and we know from observation that in 1916 Americans, on account of the European war, traveled all over this continent in swarms beyond anything known in its history, and yet railway revenues from passengers for 1916, while showing an increase over 1915, when depression ruled the land, were actually \$7,000,000 below those for 1913 and more than \$12,000,000 below those of 1914. Had our passenger revenues in 1916 shown the normal increase over 1914 they would have yielded the railways of the United States more than \$750,000,000 in passenger revenues. In fact, they were less than \$696,000,000. This loss of \$54,000,000 cannot be traced to any other cause than the automobile.

Now is this surprising, for the government recently announced that there were 2,445,664 automobiles registered in the United States. These averaged a carrying capacity of at least five per car, or over twelve million. This is more than three times the seating capacity of all the railway passenger cars in the United States.

The total number of passengers carried by the railways last year was slightly over a billion. It would have been no trick at all for the automobiles registered in 1916 to carry this billion passengers their average journey of 33 or 34 miles in one hundred days.

I present these figures to emphasize the potentialities of the motor in competition with the steam railway. On the other side of the ledger, carrying automobiles and auto supplies adds to the freight revenues and carrying the heavy trunks of tourists adds to express revenues.

There is another angle to this motor competition that does not strike the funny bone of the railway manager as you might fancy it would. The improved roads throughout the union, which are making this motor transportation increasingly popular at the expense of the railways, are themselves built, repaired, and maintained out of the funds raised by

*From an address delivered before the Nebraska Bankers' Association at Omaha, Neb., on October 24.

general taxation to which in 1916 the railways contributed over \$152,000,000.

On top of this loss in passenger traffic comes a sure loss through motor truck competition. The radius of motor truck daily delivery is now well over 30 miles and every mile of improved road the railways help lay adds to its length and efficiency. In England, where good roads have encouraged motor truckage, the railways have met the competition by going into the motor business themselves.

In Nebraska something over 81,000 automobiles are in use this year and the railways paid nearly \$2,600,000 in taxes to build roads for these motors to operate on; so you see we cannot escape this competition. How we will meet it has not yet been worked out and I confess the problem stumps me.

Let us see how it is in the neighboring state of Iowa. According to the latest census it had a population of over two and a quarter million. On the first day of July last, 169,700 automobiles were reported in use in Iowa. That is one automobile to every thirteen persons in the state. In other words, the automobiles of Iowa could carry over forty per cent of its entire population every twenty-four hours. In seating capacity they far out-rank that of all the railroad passenger cars used in Iowa.

Let us take another version of this novel situation. The average cost of an automobile is about \$500, its average life four years, its average cost of operation including chauffeur, where employed, say \$400, making a total of \$525 per car, or in round numbers \$89,000,000 per annum. This is more than four times the entire earnings from passengers both state and interstate of all the railroads in Iowa for the year ended June 30, 1915, and eight times their earnings from passengers whose journeys began and ended in the state. One-twentieth of the money spent in Iowa for automobiles, added to the railway earnings, would have sufficed to pay the taxes levied on railway property in that state last year. And a part of those taxes went to provide better roads for the joy-riders.

In spite of the fact that there are fewer passengers to carry, the railways are required to operate as many local trains as prior to the introduction of the trolley and automobile. Their trains have always been able to carry more passengers than were in sight and every year the public has demanded better and more expensive service. It is a conservative estimate to say that owing to the advance of everything entering into the service, it costs fifty per cent more to carry a passenger today than it did prior to 1907 when the two cent law was passed. The increased travel which was the theory upon which the economic excuse for that law rested has not materialized. On the contrary, owing to the competition I have mentioned, net passenger revenues have decreased and yet every effort to secure a repeal or modification of that law has failed. The legislatures of Iowa and its sister two cent states refuse to listen to pleas of the railways for a restoration of the three cent rate, although a 2.4 cent rate was pronounced reasonable by the Interstate Commerce Commission for interstate traffic.

Not only have the automobiles cut into the passenger revenues of the railways very seriously but they have added to the hazard and expense of operation to an extent little dreamed of outside of the engine cabs and the loss and damage departments. How many drivers of the 170,000 automobiles owned in Iowa or the 81,000 in Nebraska observe the signs to "Stop, Look, Listen"? It is such a small percentage that the engineers believe that all ignore the warning. Anyhow accidents due wholly to automobiles are increasing to an alarming extent. And although in ninety-nine cases out of a hundred these accidents are due to the recklessness of the automobilists the assessment of damages against the railways for injuries to these trespassers increases in almost exact ratio with the increase of automobiles. And

the demand for the abolition of all grade crossings promises to impose added millions to the enormous sums already irrevocably invested in the railways of the United States.

These are no fancy figures or fictitious conditions that I have hurriedly presented for your consideration. In the presence of an almost universal prosperity they intrude themselves upon the attention of the railway managers. They are a few of the death's heads continually present at our feasts over increased traffic. To the sober minded railway official there is little to rejoice over the enormous traffic that taxes his resources and facilities beyond their economic capacity. This is especially true, if the rate at which that traffic is handled does not in itself provide a reasonable return on investment and sufficient surplus for tomorrow's losses.

You bankers are or should be interested in this matter almost as much as railway officials. The financing of railways new and old is a part of your business. You have influence with your state legislators. It is in your power to persuade them that in squeezing the life blood out of the railways with two cent laws and a thousand and one arbitrary requirements they are killing the transportation goose upon which the business of this vast continent depends. In its infancy the goose may have been a wild one. Today it is the tamest bird that is permitted to fetch and carry for a great people.

SWITCH ENGINES FOR THE LOUISVILLE & NASHVILLE

The Louisville & Nashville has recently built eight 8-wheel superheater switch engines, road numbers 2100 to 2107, at its South Louisville shops, that are giving excellent results. These locomotives weigh 219,000 lb. on drivers in working order, and have a tractive effort of 46,900 lb. at a working boiler pressure of 170 lb. They are equipped with the sectional fire brick arch on water tubes, Schmidt superheater, Walschaert valve gear and a power reverse gear* designed by M. F. Cox, assistant superintendent of machinery. These were the first superheater switch engines to be used on this road, and in order to obtain more accurate knowledge of the working service rendered by them, a practical running test of a month's duration was made in comparison with a six-wheel, non-superheater switch engine previously used in the same service in which the new engines are now regularly employed. The following table gives the principal dimensions of these two terminal engines, the average boiler pressure and the actual working time during the test:

| | 6-Wheel Switcher | 8-Wheel Switcher |
|--|------------------|-------------------|
| | Saturated Steam | Superheated Steam |
| Weight on drivers..... | 138,000 lb. | 219,000 lb. |
| Cylinders (diameter and stroke)..... | 19 in. by 26 in. | 23½ in. by 30 in. |
| Diameter of driver..... | 52 in. | 51 in. |
| Boiler pressure | 180 lb. | 170 lb. |
| Tractive effort | 27,600 lb. | 46,900 lb. |
| Average boiler pressure during test... . | 174.4 lb. | 162.3 lb. |
| Actual working hours..... | 654½ | 749 |

The report shows that during the test the eight-wheel switcher evaporated 28,000 gal. of water more than the other, and consumed 19,600 lb. less coal. At the same time it performed three times as much work; that is to say, it moved three times the actual tonnage per hour of the smaller engine. This exceptionally large difference in tonnage handled by the superheater engine is due to several reasons: The new engine is powerful enough to handle the freight trains intact, whereas the lighter switch engine found it necessary to move them in sections; the superheater engine is much smarter than the saturated steam engine, and will pick up and get away with a load in a much shorter time; where long hauls are necessary the superheater engine will operate at greater sustained speeds, and with a larger num-

*A description of this power reverse gear was published in the *Railway Age Gazette*, November 10, page 839.

ber of cars than the saturated steam engine. In addition to this the quickness with which the cars can be switched, due to the power reverse gear, is responsible for a large part of the increased work performed by the superheater engine. Engineers who handle these engines state that the power reverse gear alone enables them to accomplish from 10 to 15 per cent more work than with those engines which do not have this gear. This has been found to be true on other railroads operating switch engines with the power reverse gear. During the test the maintenance cost for the two engines was practically the same.

These new engines have a weight per axle of 54,750 lb. and a factor of adhesion of 4.68. The boiler is made in two courses, the first course having an outside diameter of 80 in. It is designed for a working pressure of 200 lb. The frames are 5 in. wide, and have a depth of 7 in. in the pedestal jaws. The engines are well proportioned, unusually free steamers with an abundance of firebox heating surface. They have a superheater heating surface of 525 sq. ft., and a total equivalent heating surface* of 3,167 sq. ft. The general dimensions and important data concerning these locomotives are as follows:

General Data.

| | |
|-------------------------|--------------|
| Gage | 4 ft. 8½ in. |
| Service | Switch |
| Fuel | Soft coal |
| Traction effort | 46,900 lb. |
| Weight in working order | 219,000 lb. |

| <i>Boiler</i> | |
|------------------------------------|---------------------------|
| Style | Straight |
| Working pressure | 170 lb. per sq. in. |
| Outside diameter of first ring | .80 in. |
| Firebox, length and width | 105½ in. by 72½ in. |
| Firebox plates, thickness | .38 in. |
| Firebox, water space | .4½ in. and 5 in. (front) |
| Tubes, number and outside diameter | 173-2½ in. |
| Flues, number and outside diameter | 32-5½ in. |
| Tubes and flues, length | 14 ft. 8 in. |
| Heating surface, tubes | 1,485 sq. ft. |
| Heating surface, flues | 672 sq. ft. |
| Heating surface, firebox | 202 sq. ft. |
| Heating surface, arch tubes | 20 sq. ft. |
| Heating surface, total | 2,379 sq. ft. |
| Superheater heating surface | 525 sq. ft. |
| Equivalent heating surface* | 3,167 sq. ft. |
| Grate area | .53 sq. ft. |
| Smokestack, diameter | .16 in. |
| Smokestack, height above rail | 15 ft. 3 in. |
| Center of boiler above rail | 9 ft. 9 in. |

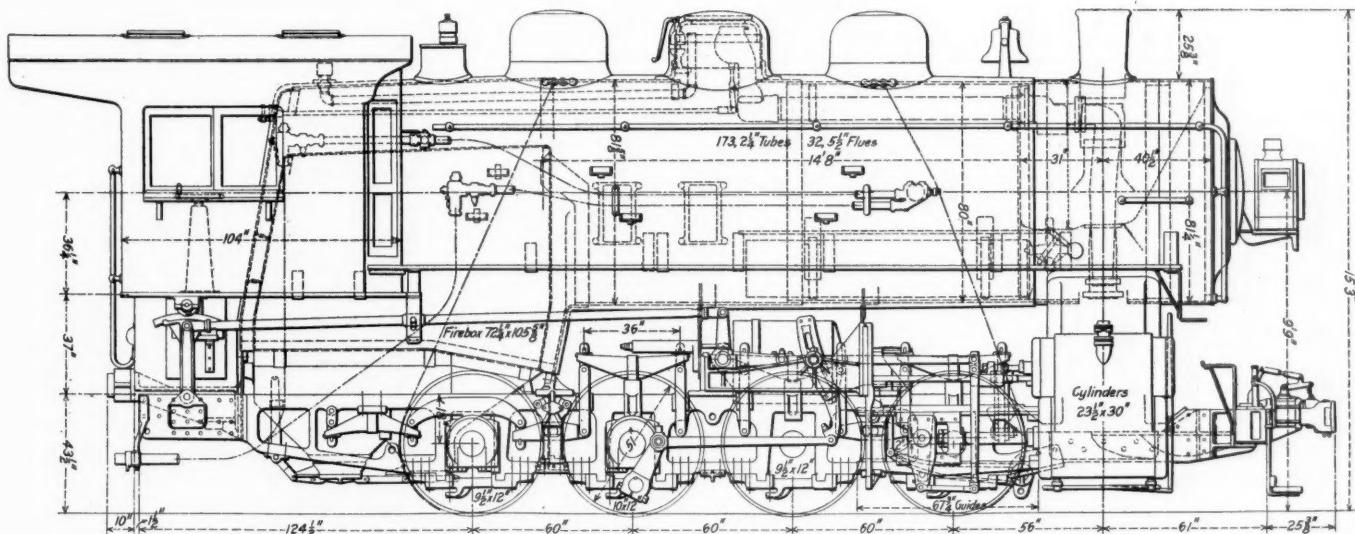
Tender

| | |
|----------------|--------------|
| Tank | Water bottom |
| Weight (light) | 58,565 lb. |
| Water capacity | 7,000 gal. |
| Coal capacity | 12 tons |

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

ELECTRIC HEADLIGHT CASE

The Interstate Commerce Commission has taken under advisement without comment, after all-day oral arguments on November 27, the controversy concerning the proposed rule to adopt high power locomotive headlights. The details of the hearings which were held on October 30 and 31 and



Eight-Wheel Switch Engine Built by the Louisville & Nashville

| | |
|--|-------------|
| Weight on drivers | 219,000 lb. |
| Weight of engine and tender in working order | 358,000 lb. |
| Wheel base, driving | 15 ft. |
| Wheel base, total | 15 ft. |

Wheel base, engine and tender..... 54 ft. 4 in.

Ratios.

| | |
|---|--------------|
| Weight on drivers ÷ tractive effort | 4.68 |
| Total weight ÷ tractive effort | 4.68 |
| Tractive effort X diam. drivers ÷ equivalent heating surface* | 755.00 |
| Equivalent heating surface* ÷ grate area | 59.70 |
| Firebox heating surface ÷ equivalent heating surface*, per cent | 7.01 |
| Tube heating surface ÷ firebox heating surface | 9.70 |
| Weight on drivers ÷ firebox heating surface | 69.10 |
| Total weight ÷ equivalent heating surface* | 69.10 |
| Volume both cylinders | 15.1 cu. ft. |
| Equivalent heating surface* ÷ vol. cylinders | 210.00 |
| Grate area ÷ vol. cylinders | 3.5 |

Cylinders.

| | |
|---------------------|----------------------|
| Kind | Simple |
| Diameter and stroke | 23 1/2 in. by 30 in. |

Valves

| | |
|-------------------|--------|
| Kind | Piston |
| Diameter | 14 in. |
| Greatest travel | 6 in. |
| Lap | 1 in. |
| Exhaust clearance | 0 in. |
| Lead in full gear | 4 in. |

Wheels.

| | |
|---|---------------------|
| Driving, diameter over tires | 51 in. |
| Driving journals, main, diameter and length | 10 in. by 12 in. |
| Driving journals, others, diameter and length | 9 1/2 in. by 12 in. |

November 1, 2 and 3 were reported in the *Railway Age Gazette* of November 3 and 10.

In the closing oral argument, Solicitor Charles C. Paulding of the New York Central, as chairman of a special committee including Duane E. Minard of the Erie and Stacy B. Lloyd of the Pennsylvania, declared that every contention of the carriers as to the danger and impracticability of the "searchlights" in many cases had been fully established and corroborated by a preponderance of the most credible testimony. He urged that the only proper rule for the commission to adopt would be to prescribe a reasonable minimum power for headlights, to be made capable of exact measurement by beam candle power, which would enable different railroads to adapt their headlights to the widely-varying conditions on different lines in different localities, which the testimony showed is essential to safe and efficient operation.

Grand Chief Warren S. Stone of the Brotherhood of Locomotive Engineers, made the only argument for the electric headlights, speaking for two hours and citing the testimony of member engineers that they had had no trouble whatever in using the intense headlights on western roads,

such as being blinded by the dazzling glare when trains meet, misreading of signals through false colors, phantom lights and reflections, as described by a score of engineers called by the carriers and testified to as the result of numerous tests. He insisted that the electric headlights should be considered a safety device.

Solicitor Paulding pressed the point upon the commission that what might be satisfactory and safe on one railroad might be impracticable and dangerous on another, because of the variance of local conditions, and that what can be used on the single-track lines in the sparsely-settled regions of the West might be utterly impossible on the multiple-track roads of the East and in the congested districts and suburbs around the big cities. He reviewed the voluminous testimony at length to support the insistent declaration of operating officials and many enginemen that the "searchlights" would be a serious menace to safe operation where traffic is dense and many trains are constantly passing one another at high speed on adjoining tracks, setting at naught the elaborate systems of block signals, through which safe operation has been achieved and the accurate operation of which depends upon correct reading of colored lights by engineers.

Attorney Lloyd made the closing argument, answering the plea of Grand Chief Stone, and briefs were filed by both sides.

CHARGES VIOLATION OF PENAL LAW

A sensational feature of Solicitor Paulding's vigorous argument was the statement that the brotherhood chiefs, in expelling engineers from membership for testifying to their belief that the electric headlights are dangerous, had violated the Federal Penal Code, which prescribes a fine of \$5,000 and six years' imprisonment for intimidation or wrongful influencing of witnesses in a proceeding before a United States court or commissioner.

The railroads' counsel scathingly denounced the brotherhood constitution's provision providing that "any member who interferes with a legislative matter being conducted by the legislative board shall be expelled." He called attention to the warnings sent broadcast to engineers that they were subject to expulsion if they testified, and cited the case of David Trostle, an engineer who admitted under oath that while he was waiting to take the witness stand, Alonzo G. Pack, assistant chief inspector on the government staff of Frank McManamy, had "reminded him of the brotherhood rule that he could be expelled for interfering in legislative matters" even within the hearing chamber of the Interstate Commerce Commission. With the testimony of the brotherhood witnesses so directly contradictory of all the mass of testimony of engineers and others who testified of difficulties in vision through false colors, reflections and blinding glare from the high-power lights, as produced by the railroads, the two could not be reconciled and it resolved itself into a matter of the credibility of the witnesses, said Solicitor Paulding.

He urged the commission to consider that 85 engineers had appeared voluntarily to testify against the "searchlights" on October 30 in spite of the drastic punishment inflicted upon a score of their fellows for giving evidence previously and in face of the fact that under the law of the brotherhood they could be expelled for attending. He said that the sworn testimony given at such great personal risk, all corroborative of the contentions of the railroad operators, was entitled to the utmost credence. Counsel regretted that the commission had not been able to observe the character and demeanor of these engineers on the witness stand, having delegated the taking of testimony to Examiner-Attorney Hines. He quoted numerous expressions, including that of one engineer that he had voluntarily come "to protect myself and the public against the enforced use of a device which means death."

STATE RAILROAD LEGISLATION IN 1916

Statutes affecting the operation of railroads, as passed by eight legislatures in 1916, are abstracted below:

LOUISIANA

In its 1916 session the legislature of Louisiana passed four bills affecting the operation of railroads. Senate Bill 178 prohibits the malicious removal or interference with journal bearings or brasses, parts or attachments of any locomotive, tender or car, or any fixture or attachment belonging to or connected with such equipment. Proof of the possession of any of the above named articles without the authority of the railroad constitutes *prima facie* evidence that they were stolen.

Senate Bill 179 makes it unlawful for any person to purchase or receive for sale, in pledge, on storage, or for safe keeping any link, pin, bearing, journal or other article of iron, brass or metal, which is used exclusively for railroad purposes, without the written consent of the president, vice-president or purchasing agent of the railroad owning the same.

House Bill 375 prohibits any person or firm from requiring employees to purchase food, clothing or merchandise from any individual person, firm or corporation, or to exclude from work, punish or blacklist any employee for failure to deal with such parties.

Senate Bill 174 authorizes municipal corporations to require railroads within the limits of the municipality to maintain at intersections of tracks with streets, gas or electric lights, similar to, and of equal power, to those used for municipal street lighting. Railways may appeal to the courts to test the necessity for, and reasonableness of, any individual ordinance affecting the installation of lights.

SOUTH CAROLINA

At the last session of the South Carolina legislature the following laws were passed:

House Bill 1368 provides for the appointment by the governor of a board of conciliation the duties of which are to investigate industrial disputes, strikes or lockouts, to report their findings to the governor and the general assembly, to act as arbitrators when requested by both parties, and to remove, as far as possible, the causes for such disputes. The board shall consist of three members, one an employer, one a member of a labor union and the third neither an employer nor an employee.

House Bill 1470 requires every railway receiving live stock for transportation to load it not more than two hours before the scheduled departure of trains, and to unload within two hours after arrival at destination. This act does not apply at stations where no unloading pen is maintained, or where there is no agent on duty when the train arrives. A longer time may be allowed for loading or unloading if voluntarily consented to in writing by the owner or shipper. A consignee desiring a longer time for unloading must make his request in writing.

House Bill 1256 amends Section 4 of an act approved February 19, 1915, making it unlawful for any railroad to remove its line from any incorporated town of more than 500 inhabitants through which it runs.

Senate Bill 1007 amends a locomotive headlight statute by extending the time in which all locomotives must be equipped with headlights of a specified character from February 2, 1916, to February 2, 1917.

KENTUCKY

Railroad legislation passed in the last session of the Kentucky legislature includes a statute requiring railways to pay employees as often as semi-monthly all wages earned up to not more than eighteen days prior to the date of payment. Another law applying to restaurants or other public places where food is sold, incidentally applies to railroads.

It includes provisions for the proper lighting, draining, plumbing, ventilation and sanitation of such places, and the protection of food from flies, dust and dirt.

VIRGINIA

The following laws were passed in the last session of the Virginia legislature:

Senate Bill 99 and House Bill 405 prohibit the use of common towels in any public lavatory or washroom in any building, or any railroad train or steamboat.

House Bill 208 requires railways to equip locomotives, operated through or near wooded country and not burning oil, with appliances to prevent, as far as possible, the escape of sparks from smokestacks, and of fire from ash pans and fireboxes.

House Bill 321 prohibits a common carrier or innkeeper from discriminating against persons in the military or naval service of the United States, provided that such persons are sober, orderly and willing to pay civilian rates.

MASSACHUSETTS

In its last session the Massachusetts legislature passed two amendments to the arbitration act of 1914, one providing that the act shall cease to be operative when the State Board of Conciliation and Arbitration determines that the business of the employer, implicated in labor trouble, is being carried on in the normal and usual manner and to the normal and usual extent. The board can make this determination upon application of the employer only after a full hearing of all persons involved. The other amendment modifies the penalty section of the act by providing that investigation, which is required before fines can be assessed, be made by the State Board of Labor and Industries, instead of the Board of Conciliation and Arbitration.

NEW JERSEY

The state legislature of New Jersey passed a law in its last session authorizing boards having charge of public park lands through which a railway passes, to make agreements with the railway for changing the location of tracks when such a change is desired by the board, to make an agreement as to the payment of costs, and to grant the road a right of way for new location.

NEW YORK

In the last session the legislature of New York passed the following laws affecting railroads:

House Bill 176 amends Section 21, Chapter 481, Laws of 1910, relating to crossings by requiring railways which cross highways at grades to construct and maintain roadways of planking, or equally serviceable material. Such roadways must be at least 16 ft. wide, must extend one foot outside of the rails and cover the entire space between the rails.

House Bill 995 amends Section 193 of the penal law by extending the time during which livestock in transit may be confined from 24 to 28 consecutive hours.

House Bill 408 amends Section 1982 of the penal law, making it a misdemeanor for a railway to employ in or about the operation of an engine or train, men unable to read time tables and ordinary handwriting, unable to speak, hear or understand the English language, or to see and understand signals required by the book of rules governing the operation of trains. This act does not apply to flagmen at street crossings.

MISSISSIPPI

The state legislature of Mississippi passed the following laws affecting railroads at its last session:

House Bill 684 requires railroads to erect warning strings at a distance of not less than 100, nor more than 250 ft., on both sides of bridges or overhead objects which have not

a clearance of at least 22 ft. from the top of the rails, and at least 7 ft. between running board of cars and lowest projection.

House Bill 379 imposes a license fee on individuals or corporations contracting to operate grab cars, boarding cars or commissaries in box cars, of two or more outfits, for supplying employees or others with goods or merchandise. A fee of \$100 is levied for each county in which they operate that has a city, town or village of 10,000 inhabitants or more; \$50 for each county that has a city, town or village of less than 10,000 or more than 5,000; and \$10 for each county having only smaller towns. This act does not apply to roads operating their own grab cars for furnishing merchandise to their employees only.

TRAIN ACCIDENTS IN OCTOBER¹

The following is a list of the most notable train accidents that occurred on the railways of the United States in the month of October, 1916:

| Collisions | | | | | | |
|------------|-----------------------|---------------|------------------|---------------|-------|-------|
| Date | Road | Place | Kind of Accident | Kind of train | Kil'd | Inj'd |
| 1. | Atlantic C. L..... | Folkston. | rc | P. & P. | 0 | 32 |
| 4. | Atlantic C. L..... | Hobgood. | rc | P. & F. | 0 | 2 |
| *5. | Penn. | Lewistown. | rc | P. & F. | 2 | 22 |
| 8. | C. C. C. & St. Louis. | Fern Bank. | xc | F. & F. | 3 | 2 |
| 12. | W. Maryland..... | Cumberland. | xc | P. & P. | 2 | 13 |
| 12. | Mobile & Ohio..... | Corinth. | bc | F. & F. | 0 | 3 |
| *15. | Chicago, B. & Q..... | Elwood, Neb. | rc | F. & F. | 10 | 11 |
| 24. | Union Pac..... | Bushnell. | xc | P. & F. | 2 | 3 |
| 26. | Missouri Pac..... | Lake June. | bc | P. & P. | 0 | 6 |
| 28. | C. C. C. & St. Louis. | Rushsylvania. | rc | F. & F. | 0 | 5 |

| Derailments | | | | | | |
|-------------|-----------------------|---------------|---------------------|---------------|-------|-------|
| Date | Road | Place | Cause of derailment | Kind of train | Kil'd | Inj'd |
| 3. | N. Y. N. H. & H..... | Bridgeport. | acc. obst. | P. | 0 | 0 |
| 6. | Chicago & A..... | Granite City. | unx | P. | 0 | 6 |
| 10. | Augusta So..... | Gibson. | unx | P. | 0 | 5 |
| 15. | Seaboard A. L..... | Clinton. | unx | P. | 1 | 0 |
| 16. | Southern Pacific..... | Watsonville. | unx | P. | . | . |
| 19. | Chicago & N. W..... | Manitowoc. | malice | P. | 2 | 0 |
| 21. | Southern Pacific..... | Pinto, Tex. | malice | P. | 0 | 3 |
| 23. | Phila. B. & W..... | Perryman. | .... | F. | 2 | 1 |
| *26. | Illinois Trac'n..... | Edwardsville. | malice | P. | 1 | 2 |
| 27. | Georgia..... | Union Pt. | malice | P. | 3 | 0 |
| 29. | Missouri, K. & T..... | Lancaster. | loose tire | P. | 0 | 12 |

The trains in collision at Folkston, Ga., on the evening of the first of October were northbound passenger trains, the "Dixie Flyer" and the "Southland." The engineman and fireman and five other employees, and 25 passengers were injured. The "Southland" was standing at a water tank, and its rear car was wrecked for several feet at the rear end. The collision was due to the failure of the engineman of the "Dixie Flyer" to heed automatic signals, a distant and a home, set against him.

The trains in collision near Hobgood, N. C., on the morning of the 4th, were a northbound passenger and a northbound freight, the passenger running into the rear of the freight. The engineman and fireman were injured. Responsibility for the collision is attributed to the conductor of the freight, who neglected to drop off a fusee.

The trains in collision at Lewistown, Pa., on the morning of the 5th, were eastbound passenger No. 6, the Mercantile Express, and a preceding freight train, which was crossing from one track to another. The conductor of the freight train and a drover were killed, and fourteen passengers and eight mail clerks were injured. The collision occurred in a dense fog, about 1 a. m., and the passenger train appears to have passed distant and home signals set against it. The cars in the passenger train were of steel, and the injuries on this train were not severe. In the freight train, four cabooses and seven cars of cattle were destroyed. A fire broke out in the wreck and the body of the drover was burnt up.

¹Abbreviations and marks used in Accident List:
rc, Rear collision—bc, Butting collision—xc, Other collisions—b,
Broken—d, Defective—unf, Unforeseen obstruction—unx, Unex-
plained—derail, Open derailing switch—ms, Misplaced switch—acc.
obst., Accidental obstruction—Malice, Malicious obstruction of track, etc.
boiler, Explosion of locomotive on road—fire, Cars burned while
running—P. or Pass., Passenger train—F. or Ft., Freight train (including
empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly
destroyed by fire—Dagger, One or more passengers killed.

The trains in collision at Fern Bank, Ohio, on the 8th, were a westbound and an eastbound freight, and one engine and three cars were wrecked. Three trainmen were killed and two were injured. The collision occurred within interlocking limits, during a dense fog. The cause was the disregard, on the part of the westbound train, of a distant and a home signal, set against it.

The trains in collision, near Cumberland, Md., on the 12th, were an excursion train bound for Hagerstown, and a yard train carrying employees. Two employees were killed, and 17 employees and 13 passengers were injured. There was a dense fog at the time. The collision was due to misunderstanding or misconstruction of orders (or rules) on the part of the excursion train, which was running as an extra.

The butting collision near Corinth, Miss., on the 12th, was between through freight trains. Both engines were wrecked and three trainmen were injured. The cause of the collision was a mistake on the part of an operator, allowing one of the trains to pass the station where it should have waited for the other.

The trains in collision at Elwood, Neb., on the 15th, were eastbound cattle trains. The leading train had come to a stop, and its caboose was wrecked by the engine of the following train. Twenty or more men, including a number of drovers, were in the caboose of the leading train, and of these men, ten were killed and eleven were injured. The cause of the collision was the failure of the men in charge of the standing train to properly signal the train following.

The trains in collision near Bushnell, Neb., on the 24th, were a westbound freight, standing on the center passing track, and an eastbound freight, which had run past distant and home automatic block signals set against it. A part of the wreck fell on the westbound main track, and was run into by a passenger train. Two trainmen were killed, and three injured.

The trains in collision at Lake Junction, Mo., on the 26th, were eastbound and westbound passenger trains, the eastbound train being on a side track. The westbound train entered the siding by reason of a switch being misplaced by the station man a moment before the train reached it. Four passengers and two trainmen were injured.

The trains in collision at Rushsylvania, Ohio, on the 28th, were a freight and a wrecking train. The freight was standing on a side track and was run into at the rear by the wrecking train. Five employees were injured.

The train derailed at Bridgeport, Conn., on the 3rd, was a southbound passenger. At the crossing of a street the train struck a cart, killing the driver and his horses; the wreck of the cart turned a switch, and because of this the train ran on to a side track where the engine was knocked off the track by striking a car and fell off a wall to the street. Here another cart was wrecked, but its driver escaped. The engineman and fireman escaped by jumping off.

The train derailed near Granite City, Ill., on the 6th, was westbound passenger No. 3. Six passenger cars were overturned, injuring a mail clerk and several passengers.

The train derailed near Gibson, Ga., on the 10th, was a southbound special carrying a show. Two box cars were overturned, and five passengers were injured. The cause of the derailment was not discovered.

The train derailed at Clinton, S. C., on the 15th, was southbound passenger No. 5. The train was running at low speed around a curve; three cars were overturned. The fireman was fatally injured by jumping off.

The train derailed near Watsonville, Cal., on the 16th, was a northbound express. The mail car was overturned.

The train derailed near Manitowoc, Wis., on the 19th, was northbound passenger No. 111. The engine and three cars were ditched. The engineman and fireman were killed. The derailment was due to a misplaced switch. The switch

had been thrown by some malicious person who had changed the light to indicate all-right.

The train derailed at Pinto, Tex., on the 21st, was eastbound passenger No. 8, and the engine and four coaches were ditched. Three trainmen were slightly injured. The cause of the derailment was a malicious obstruction.

The train derailed at Perryman, Md., on the 23rd, about 2 a. m., was a southbound freight. The train was moving on a side track, and, its speed not being properly controlled, the engine was ditched at the derailing switch at the outgoing end of the siding. The engineman and fireman were killed.

A locomotive, without a train, northbound, coming along a few minutes afterward, ran into the wreck and its fireman was slightly injured.

The engineman of the southbound train evidently lost control of his engine soon after entering the siding as his speed increased considerably after leaving the main track.

The train derailed on the Illinois Traction Line near Edwardsville, Ill., on the 26th, was southbound passenger No. 79, consisting of a single coach. The coach fell down a bank and took fire from its heating stove. One passenger was burned to death and two were injured. The derailment was due to a loose rail, spikes having been pulled, by persons unknown, on both sides of the track.

The train derailed at Union Point, Ga., on the 27th, was westbound passenger No. 1. The engine was overturned and the three men on it were killed. The cause of the derailment was a maliciously misplaced switch.

The train derailed at Lancaster, Tex., on the 29th, was a northbound passenger. Three coaches left the rails and twelve passengers were slightly injured. The derailment was due to a loose driving-wheel tire.

A NEW TELEGRAPHIC CIPHER CODE

A new telegraphic code has been prepared by J. Edwin Dempsey, Chicago, for general railroad use; and it has already been adopted by a number of prominent roads. It aims not only to take the burden off wires by reducing the length of telegrams, but to be so simple and well adapted to the needs of the user that the economy in transmitting messages is not overbalanced by the added cost of coding and decoding. As a bulky code book may defeat the end it is designed to accomplish, i. e., ready use, the Dempsey book was not prepared for general application to all railroads, but is modified to suit the peculiar requirements of individual lines, as determined after a thorough study of its telegraphic messages. All Dempsey books, however, contain standard expressions to cover the needs of interline messages, thus preparing the way for a universal system of inter-carrier coding, as more roads adopt this system. The code book is a small volume, 4 1/4 in. by 6 3/4 in. and 3/8 in. thick, containing 219 pages. It includes a vocabulary of words and phrases commonly used in carrying on the business of an individual road, arranged alphabetically, thumb indexed and cross indexed, all phrases being classified according to the prominent word in the phrase. The back part of the handbook is devoted to special departments (also alphabetically arranged and thumb indexed), covering freight classification terms, the names of railroads, railway associations and standing committees, common commodities, numerals and rates, prominent shippers on the line, officers, titles and stations peculiar to the carrier.

A valuable feature of the system is the utilization whenever possible of tables to cover the large number of stereotyped messages which differ only as to detail. Tables have been prepared to cover sleeping and parlor car reservations and cancellations, ticket deliveries, requests for domestic and export freight rate quotations and answers thereto, embargoes, the tracing of c. l. and l. c. l. freight, the handling of

baggage, references to incoming and outgoing letters and their dates, etc. For example, one table covers reservations for accommodations on standard sleeping and tourist sleeping cars and parlor cars. The code words are classified under the general headings, "standard sleeping car," "tourist sleeping car" and "parlor car"; under the primary sub-headings, "drawing room," "compartment," "section," "lower berth," "upper berth," and "seats"; and the secondary sub-headings, "answer by wire" and "answer by mail." The code words are alphabetically arranged in columns under each secondary sub-heading, a different word being provided for each date of the present and coming month. To illustrate: If a reservation is to be made for a lower berth on a standard sleeper and a prompt reply to the request is desired, the code word will be used which is in line with the proper date in the column under the general heading "standard sleeping car," the primary sub-heading "lower berth" and the secondary sub-heading "answer by wire." If for instance the code word under these heads were "plate," to apply to the date, November 25, and the name and address of the party desiring the berth were Appleton, New York, the message would read: "Plate Appleton, New York." It is understood with each message that the reservation will be claimed at the point of application unless otherwise specified, when the name of the station where it will be claimed is added to the message, as for example, "plate

Railroad Wires:

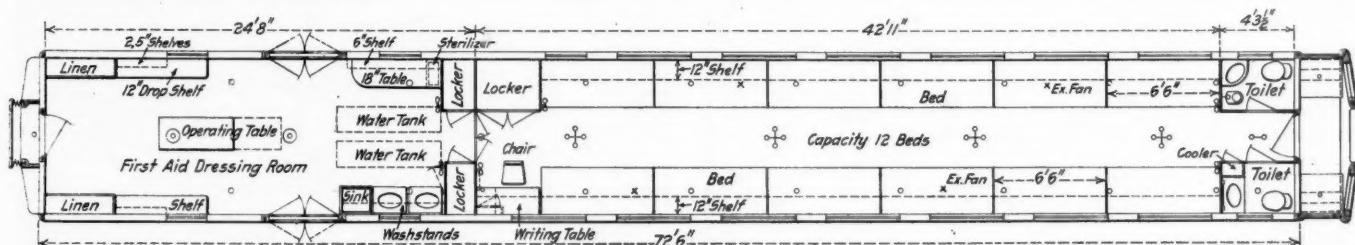
| | |
|--|--------|
| Messages sent | 1,191 |
| Total number of words sent..... | 16,674 |
| Total number of words by new Dempsey system..... | 3,573 |

It will be noticed that the saving in words effected by the new Dempsey system amounted to 9,280, or 76 per cent, for commercial messages, and 13,101, or 78 per cent, for messages over railroad wires. The monetary saving on commercial messages that would have accrued under the new code was \$159.54, or 54 per cent.

The Dempsey system was completed in 1915. It was recommended for the use of its members by the American Association of Passenger Traffic Officers at its meeting at Washington, D. C., in October. The system was adopted by the Chicago, Milwaukee & St. Paul last January for application in its traffic department, and has since been adopted, for use in all departments, by the Grand Trunk, the Grand Trunk Pacific, the Central Vermont, the El Paso & Southwestern and the Northern Pacific.

HOSPITAL TRAIN FOR THE UNITED STATES ARMY

The Pullman Company has recently delivered to the United States Government a train made up of 10 cars for use by the Medical Department of the U. S. Army at the Mexican border. This train has a berth and bed capacity

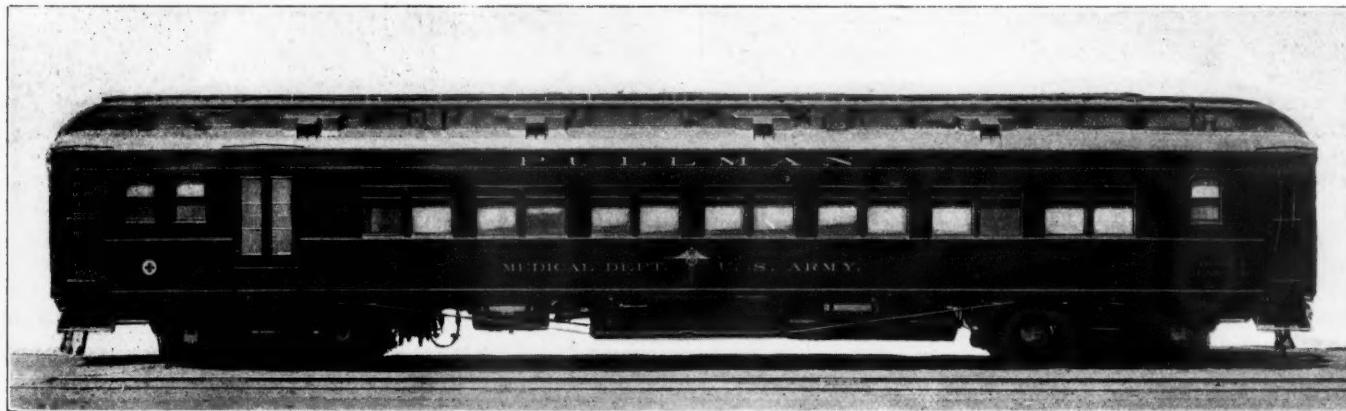


Floor Plan of "First-Aid" Car

Appleton, New York, Philadelphia." An advantage of the tabular system is that a table may be placed under a glass before each clerk, covering his particular branch of service, thus relieving him of the necessity of referring to a book to codify or decodify messages.

In negotiations with a railroad which has since adopted

for 258 persons, including the attendants accompanying the train and the patients. The first two and the last cars are to be used by the attendants and officers in charge. The other seven cars are arranged especially for the patients and contain 52 standard government hospital beds, 16 lower berths and 14 upper berths. The first car contains the



Side Door Patient Car for U. S. Hospital Train

this code, Mr. Dempsey, the originator, took one month's messages from a city ticket office of that road—which was using the old Dempsey code—and recoded them according to his new system, with the following results:

Commercial wires:

| | |
|--|----------|
| Western Union messages sent..... | 841 |
| Total number words sent..... | 12,092 |
| Cost | \$454.74 |
| Total number of words by new Dempsey system..... | 2,812 |
| Cost by new Dempsey system..... | \$159.54 |

kitchen for the entire train. This occupies a space the full width of the car and is 16½ ft. long. This car is made from a standard tourist sleeper with a steel underframe and contains 14 lower berths and 15 uppers. Portable tables are provided for use in the berths, on which the meals are served. This car has ample locker space, a shower bath and a hot water heater for heating the car.

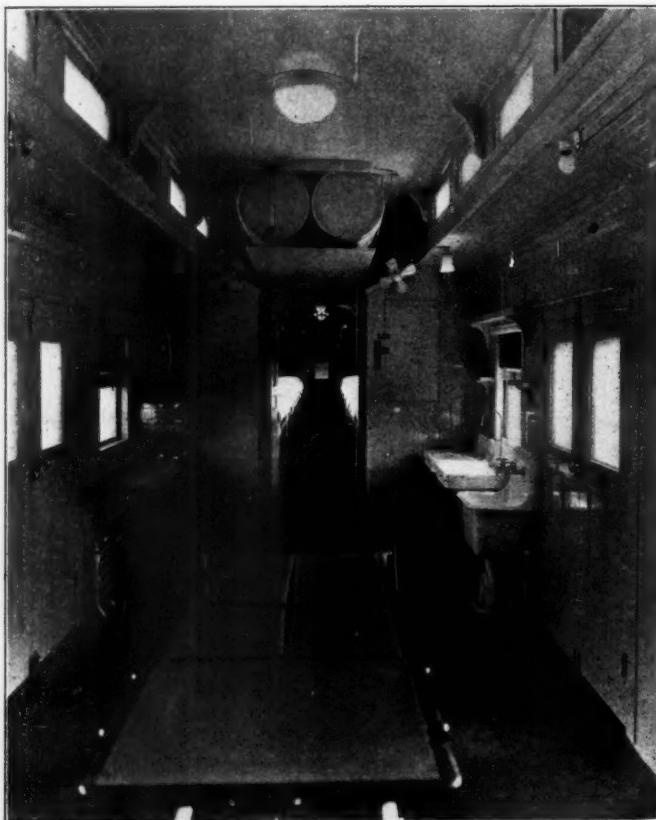
The second car is a standard 16-section tourist sleeper.

the berths in one section of which are removed and the space made into an "office" which contains a field desk, such as is used in the United States Army. This car is also provided with large locker space, a hot water heater and a shower bath, and is used by the attendants accompanying the train. The third, fourth and seventh cars in the train are identical. They are made from tourist cars with the lower berths removed and 3-ft. side doors added for convenience in moving the patients in and out of the car. Each of these cars contains 14 regulation government hospital beds, which are securely attached to the floor. The upper berths are retained, to be used by the moderately ill patients. These cars contain lavatories, toilets and hot water heaters for heating the cars, together with ample locker space.

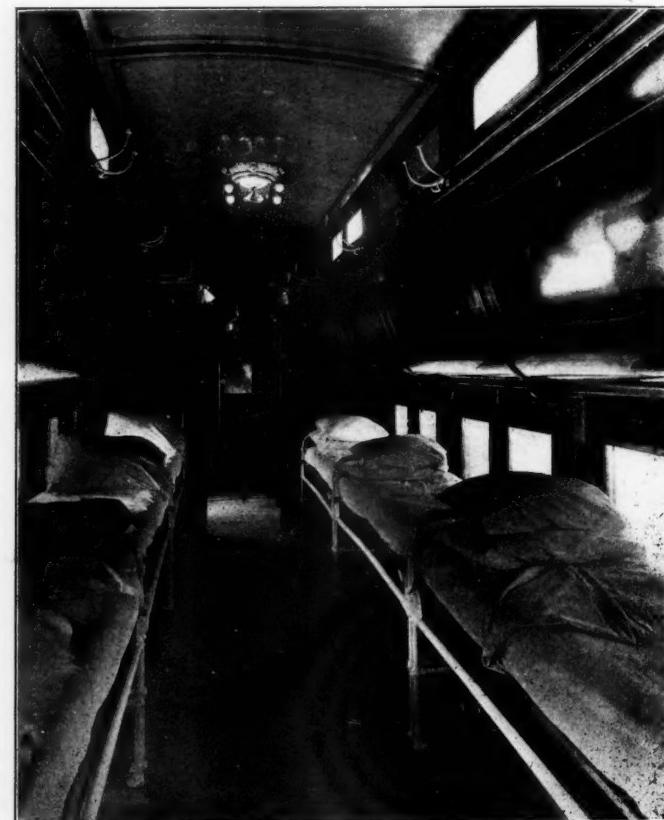
The fifth car in the train is designated as the "first-aid patient car." It contains a dressing-room, which occupies 24 ft. 8 in. of the length of the car and in which is pro-

directly from the steam line in the train; 4-ft. side door openings open into the storage room. The ninth car of the train is a standard tourist car with 16 lower and upper berths, with lavatory, toilet and locker facilities at each end. This car is heated by a hot water heater. It is used for patients suffering from minor injuries and ailments. The tenth car in the train is a standard drawing-room steel-underframe Pullman sleeper for the officers accompanying the train. This car has 14 complete sections with one drawing-room. A shower bath is provided in each end of the car.

All the cars are lighted by electricity from a 30-volt axle generator system applied to each car. All the doors and windows are thoroughly screened, and each car is fitted out with at least four electric fans. There is a large locker space and plenty of extra blankets and wide overhead racks in the patients' cars for the men's equipment. Extra large water carrying capacity is provided, particularly in the



Interior of "First-Aid" Car Showing Dressing Room and Hospital Beds



Interior of Patient Car with Hospital Beds and Upper Berths

vided an operating table. This car was made from a parlor car and contains 12 hospital beds with no upper berths. Four-foot side door openings were made in the end, in which the dressing-room is located. The dressing-room is equipped with suitable closets, overhead water tanks, and a sterilizer for sterilizing the operating instruments, bandages, etc. It is painted with regulation interior hospital finish. It is not provided with any hot water heater, being heated directly from the steam line in the train. The seventh car is a remodeled tourist car and contains 14 hospital beds and 14 upper berths. It also has 3-ft. side doors with lavatories and ample locker space, and it is heated by a hot water heater.

The eighth car has a 24 ft. 8 in. storage room at one end of the car for the purpose of storing the various supplies and equipment for the entire train. It is a remodeled parlor car and contains 12 hospital beds. This car is heated

kitchen and "first-aid" cars. The outsides of the cars are painted with the Pullman standard finish, with a red cross emblem on each side of the car. These cars were turned over to the government 20 days after the order for them was received.

FRENCH RAILWAYS SEEK INCREASES.—The railroad situation in France has arrived at a point where the roads have asked permission to raise rates, both freight and passenger. Since the beginning of the war the losses of the state railroads have been 370,000,000 francs, (\$71,410,000) while the other roads have lost 790,000,000 francs, (\$152,470,000) and all indications are that next year they will be nearly double the losses of last year. At the same time that receipts are going down, expenses are increasing. Coal, rails, oil, grease and wood all are much higher, and the roads see no hope unless they are allowed to increase their rates.

General News Department

At Shenandoah, Va., November 25, the shops of the Norfolk & Western were badly damaged by fire; estimated loss, including damage to four locomotives, \$100,000.

The Woodstock & Sycamore, an interurban road operating a line about 26 miles long between Sycamore, Ill., Genoa, and Marengo, and using gasoline cars, contemplates electrifying the road in the early spring.

At the Reading (Pa.) shops of the Philadelphia & Reading last Saturday afternoon the general manager, Charles H. Ewing, presented to the Reading shop baseball team the A. T. Dice cup. This team won the pennant in competition with several other Reading system teams during the past season. There was music by the shop band, and singing by some of the shopmen.

On the Buffalo, Rochester & Pittsburgh, when some act of more than ordinary merit is performed by an employee, a letter of commendation is entered on his record, and his name is placed on the Roll of Honor, which appears in each issue of the monthly Employees Magazine. During the past four years over 1,000 names have been placed on this roll. Having a place on this honor roll stamps an employee as alert, observing and interested.

The tenth annual cement show will be held at Chicago next February, from the 7th to the 15th, inclusive. The exhibition will be housed under one roof, the balcony as well as the main floor and annex of the Coliseum being used. Over 150 prospective exhibitors have signed for space, 60 of which will be assigned to the balcony. The exhibits are expected better to represent the cement industry as a whole than those of any previous shows.

The college of engineering of the University of Illinois will dedicate, on December 6 and 7, a ceramic engineering building, with laboratories equipped with the latest types of apparatus needed for instruction and research in the manufacture of brick, tile, sewer pipe, terra cotta, cement, glassware, electrical and thermal insulating materials and other ceramic products. The building is three stories in height and covers a ground area of 67 ft. by 189 ft.

Two masked bandits robbed the express car of a Chicago & North Western passenger train, running from Minneapolis to Chicago, on Thursday night, November 23. The men boarded the train near Barrington, Ill., walked into the express car, the door of which had been left open, and bound and gagged the express messenger. After breaking the safe, they secured over \$600 in cash, largely consisting of remittances from local railroad agents along the line, and left the train at Clybourn Junction, three miles from the Chicago terminal.

The Railroad Young Men's Christian Association at Brunswick, Md., was rededicated November 15, and there were present Oscar G. Murray, chairman of the board of directors of the Baltimore & Ohio, and other officers. They took part in the dedication of a pipe organ which Mr. Murray gave to the employees. Other gifts which were accepted on behalf of the employees at the evening's exercises were a pulpit, given by Vice-President A. W. Thompson; a bible from James S. Murray, and a set of offering plates from T. Carroll Roberts.

The Pennsylvania Railroad, as part of its campaign to teach children the dangers of taking "short cuts" over railroads and playing on the tracks, has issued an illustrated calendar for use in schoolrooms. It will be supplied for that purpose throughout the cities and towns on the Pennsylvania Lines, both east and west of Pittsburgh. A picture at the top of the calendar shows a typical crowd of children just out of school, hurrying across the tracks. One boy is seen stumbling on the track in front of an approaching train. On the first sheet of the calendar is printed an explanation of the purpose for which it is issued, and each month has some warning. An extra sheet inserted before

the opening of the New Year urges some good resolutions, including: "I will STOP, LOOK AND LISTEN at railroad crossings. . . . I will endeavor to persuade others from recklessly inviting danger."

The New York, New Haven & Hartford, on the occasion of the Yale-Harvard football game, on Saturday, November 25, carried into New Haven, in the space of three hours, 11 minutes, 32,423 passengers; and it is said that from 8,000 to 10,000 visitors had arrived in New Haven on the day before. On Saturday, the number of trains carrying passengers from New York to New Haven in the morning was 31, and the number of passengers 18,108. The trains ran through, 74 miles, in two hours. The passengers leaving New Haven Saturday afternoon numbered 33,779, and they traveled on 71 trains, starting between 4 p. m. and midnight. The number of cars used for the football traffic, in addition to the normal movement, was 612—175 Pullman cars and 437 coaches.

The arrests made by the police department of the Baltimore & Ohio during the past year, as reported by Edmund Leigh, general superintendent of police, numbered 12,704. This number included 12 murderers, 2 bootleggers, 7 pickpockets, a gang of counterfeiters, another gang of train bandits, 4 who had committed arson, and 101 others who had received stolen goods. The majority of arrests, however, was for violations of laws against trespassing, train riding, vagrancy, etc. Of the persons arrested, 43 were sentenced by the courts to the penitentiary, 4,194 to jail, 603 to workhouses, 108 to reformatories, 3 were committed to asylums, 3,899 were fined, 1,836 were paroled, 1,773 were released, and 245 are pending. The scarcity of labor has made it possible for the industrious and the honest to earn a comfortable livelihood; but the indolent class have taken advantage offered of traveling from place to place with less difficulty under the guise of seeking employment. The number of tramps and other derelicts is increasing with alarming rapidity, says Mr. Leigh.

The United States Civil Service Commission announces examinations for designing engineers in the Bureau of Yards and Docks, Navy Department, Washington, D. C., at salaries ranging from \$10 to \$15 a day. The duties of the position embrace the design and supervision of design of large and various engineering works in steel, concrete, reinforced concrete, etc., for the navy yards and naval stations. Competitors will not be required to report for examination at any place, but will be rated on certified statements as to their technical education, experience and fitness. All applicants must have a degree in engineering from a school of recognized standing with subsequent experience of not less than 15 years in general design work, of which five years must have been in responsible charge of the successful design of important engineering. Applicants desiring to file statements should apply at once to the United States Civil Service Commission for Form 1312, stating the title of the examination desired. Applications must be filed with the commission at Washington by December 11.

Railroad Y. M. C. A. Membership Campaign

The membership campaign for 30,000 new members, which was carried on by the Railroad Young Men's Christian Associations of North America for ten days, November 14-24, far exceeded the expectations of its promoters, and resulted in 38,124 new members. This is an addition of 42 per cent to a membership of 90,000 at 250 points, and brings the present membership to between 125,000 and 130,000. The plans for the campaign were carefully worked out in detail during a period of several months preceding the opening of the campaign, and included a continental membership committee of 10,000 railroad men. The record for a single association was established at Trenton, N. J., where 1,521 new men were enrolled. The record for any one railroad went to the Pennsylvania, with a total of 8,874.

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF FISCAL YEAR, 1917

| Name of road. | Average mileage operated during period. | | | Operating revenues | | | Operating expenses | | | Net from railway operation. | Railway tax. | Operating income (or loss). | Increase (or decrease) last year. | | |
|---|---|-------------------------|-------------|---------------------------|---------------------|-------------|--------------------|----------------|-----------|-----------------------------|--------------|-----------------------------|-----------------------------------|-----------|-----------|
| | Freight. | Passenger. (inc. misc.) | Total. | Maintenance of equipment. | Way and structures. | Traffic. | Transportation. | Miscellaneous. | General. | Total. | | | | | |
| Chicago, Milwaukee & St. Paul..... | 10,208 | \$20,575,498 | \$5,890,580 | \$29,494,862 | \$3,299,233 | \$4,318,853 | \$5,240,099 | \$9,943,880 | \$496,732 | \$18,313,515 | \$11,091,346 | \$1,472,628 | \$9,608,716 | \$925,088 | |
| Chicago, Peoria & St. Louis..... | 255 | 3,26,670 | 85,722 | 46,575 | 63,362 | 10,616 | 16,997 | 17,155 | 381,533 | 83,043 | 18,000 | 65,043 | 4,730 | 169,558 | |
| Chicago, Rock Island & Gulf..... | 477 | 64,235 | 20,754 | 5,704,705 | 145,266 | 118,880 | 29,901 | 264,492 | 3,325 | 25,933 | 587,740 | 324,221 | 2,404,308 | 2,893,737 | |
| Chicago, Rock Island & Pacific..... | 7,653 | 13,614,705 | 20,815,410 | 5,403,296 | 2,891,815 | 3,377,331 | 40,722,27 | 6,614,489 | 46,520 | 13,844,737 | 6,970,673 | 896,211 | 1,622,324 | 515,469 | |
| Chicago, St. Paul, Minn. & Omaha..... | 1,553 | 3,396,797 | 1,593,265 | 5,403,296 | 762,166 | 680,588 | 92,175 | 1,807,397 | 125,941 | 3,512,574 | 1,890,323 | 105,717 | 10,854 | 191,811 | |
| Chicago, Terre Haute & Southeastern..... | 373 | 632,224 | 255 | 363,138 | 52,004 | 95,802 | 239,115 | 12,024 | 191,499 | 10,997 | 2,976 | 32,650 | 10,727 | 337,542 | |
| Cincinnati, Hamilton & Dayton..... | 622 | 438,982 | 650,007 | 650,649 | 2,865,735 | 2,22,616 | 678,525 | 10,515 | 231,297 | 19,297 | 449,777 | 1,890,390 | 1,035,425 | 56,559 | |
| Cincinnati, Indianapolis & Western..... | 322 | 1,30,060 | 560,649 | 1,30,060 | 560,649 | 1,30,060 | 750,089 | 8,000 | 455,355 | 10,997 | 1,821,679 | 1,044,655 | 1,044,655 | 39,292 | |
| Cincinnati, New Orleans & Texas Pacific..... | 246 | 4,446,426 | 64,067 | 5,30,246 | 5,30,246 | 1,380,910 | 2,206,619 | 27,899 | 3,833,585 | 81,261 | 2,022,71 | 8,000 | 4,227,639 | 447,000 | |
| Cleveland, Cincinnati, Chic. & St. Louis..... | 2,384 | 8,185,117 | 3,000,002 | 12,228,372 | 1,390,910 | 2,92,986 | 62,781 | 75,455 | 62,370 | 14,708 | 68,244 | 1,457,226 | 887,354 | 781,196 | |
| Coal & Coke & Southern..... | 1,102 | 1,645,054 | 554,437 | 2,344,580 | 2,344,580 | 2,344,580 | 2,360 | 21,662 | 195,893 | 5,793 | 43,113 | 64,007 | 27,000 | 37,900 | 40,232 |
| Colorado Midland & Colorado Springs..... | 338 | 271,612 | 85,557 | 495,120 | 99,273 | 92,360 | 85,309 | 7,865 | 85,309 | 9,509 | 180,444 | 183,104 | 22,808 | 160,296 | 3,048 |
| Colorado Midland & Colorado Springs..... | 87 | 286,553 | 70,214 | 363,578 | 32,636 | 41,534 | 41,534 | 2,231 | 231,297 | 19,297 | 1,821,679 | 1,044,655 | 1,044,655 | 39,292 | |
| Cripple Creek & Colorado Springs..... | 164 | 671,142 | 1,096,078 | 905,082 | 92,238 | 92,238 | 92,238 | 9,419 | 224,933 | 67,520 | 255,705 | 4,677,075 | 2,211,453 | 178,79 | 406,521 |
| Cumberland Valley Co.—R. R. Dept. | 886 | 5,351,520 | 1,096,679 | 6,888,527 | 1,39,225 | 1,378,861 | 224,578 | 114,950 | 258,87 | 8,152,525 | 5,16,741 | 667,500 | 4,445,695 | —396,802 | |
| Delaware, Hudson Co. & Western..... | 955 | 9,466,429 | 1,481,493 | 13,269,266 | 1,39,225 | 1,36,760 | 961 | 1,078,480 | 1,667,975 | 101,795 | 4,554,167 | 282,000 | 2,554,167 | 272,970 | |
| Delaware, Lackawanna & Western..... | 246 | 5,144,009 | 1,348,349 | 6,891,349 | 878,549 | 1,078,480 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,64,360 | 1,64,360 | 27,114 | |
| Denver & Rio Grande..... | 255 | 399,319 | 139,583 | 566,585 | 88,845 | 88,845 | 88,845 | 1,318 | 1,667,975 | 9,509 | 180,444 | 183,104 | 22,808 | 160,296 | 3,048 |
| Denver & Salt Lake..... | 383 | 212,723 | 99,326 | 337,571 | 39,428 | 54,288 | 6,038 | 108,148 | 1,147 | 8,537 | 167,180 | 220,391 | 24,165 | 96,226 | 39,290 |
| Detroit & Mackinac Line..... | 886 | 5,351,520 | 1,096,679 | 6,888,527 | 1,39,225 | 1,378,861 | 224,578 | 114,950 | 258,87 | 8,152,525 | 5,16,741 | 667,500 | 4,445,695 | —396,802 | |
| Detroit & Toledo Shore Line..... | 191 | 511,000 | 83,477,76 | 156,748 | 12,504 | 25,320 | 25,320 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,625,604 | 1,625,604 | 69,239 |
| Detroit, Toledo & Ironton..... | 441 | 52,911,233 | 250,497 | 250,497 | 250,497 | 250,497 | 250,497 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 |
| Duluth, Mississ., & Northern..... | 411 | 5,780,655 | 97,022 | 6,141,229 | 41,025,056 | 39,428 | 9,012 | 890,045 | 3,538 | 38,297 | 1,702,377 | 4,344,383 | 401,420 | 4,037,433 | 1,027,201 |
| Duluth, Mississ., & Northern..... | 601 | 6,56,684 | 315,163 | 1,043,591 | 189,165 | 20,272 | 2,470 | 13,544 | 13,544 | 13,544 | 13,544 | 13,544 | 13,544 | 13,544 | 13,544 |
| Duluth, South Shore & Atlantic..... | 601 | 6,56,684 | 60,276 | 445,323 | 60,157 | 48,823 | 48,823 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 |
| Duluth, Wmngt. & Pacific..... | 1,028 | 2,342,848 | 52,921 | 340,563 | 319,444 | 354,009 | 54,449 | 198,566 | 1,72,232 | 1,72,232 | 1,72,232 | 1,72,232 | 1,72,232 | 1,72,232 | 1,72,232 |
| El Paso & Southwestern Co. | 799 | 3,275,875 | 112 | 3,483,719 | 302,484 | 340,833 | 19,130 | 963,081 | 1,23,490 | 399,330 | 12,119,751 | 5,094,064 | 582,441 | 1,522,783 | —100,120 |
| Elgin, Joliet & Eastern..... | 1,988 | 12,729,696 | 2,803,875 | 17,213,875 | 1,631,953 | 2,41,741 | 2,41,741 | 2,41,741 | 2,41,741 | 2,41,741 | 2,41,741 | 2,41,741 | 2,41,741 | 133,732 | |
| Florida East Coast & Denver City..... | 454 | 1,197,604 | 431,014 | 1,490,413 | 1,78,108 | 51,360 | 51,360 | 90,687 | 1,27,232 | 1,27,232 | 1,27,232 | 1,27,232 | 1,27,232 | 1,27,232 | 1,27,232 |
| Galveston, Harrisburg & San Antonio..... | 1,361 | 3,043,897 | 42,018,573 | 454,740 | 51,360 | 51,360 | 51,360 | 51,360 | 51,360 | 51,360 | 51,360 | 51,360 | 51,360 | 51,360 | 51,360 |
| Grand Trunk Wharf..... | 14 | 599,382 | 221,379 | 885,395 | 73,203 | 123,009 | 22,654 | 1,30,476 | 1,329,927 | 357 | 25,686 | 47,921 | 159,088 | 144,920 | 184,886 |
| Georgia, Southern & Florida..... | 307 | 383,463 | 188,011 | 632,060 | 81,473 | 1,20,123 | 20,123 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 | 1,667,975 |
| Gulf, Colorado & Santa Fe..... | 64 | 2,843 | 59,271 | 80,463 | 40,309 | 2,491 | 1,960 | 2,491 | 2,491 | 2,491 | 2,491 | 2,491 | 2,491 | 2,491 | 2,491 |
| Grand Canyon & Colorado..... | 575 | 883,303 | 605,378 | 1,635,934 | 192,933 | 238,461 | 22,775 | 78,909 | 61,697 | 11,803 | 52,159 | 1,144,804 | 491,150 | 10,978 | 10,978 |
| Grand Rapids & Indiana..... | 347 | 1,759,000 | 241,436 | 304,000 | 241,436 | 253,908 | 409,597 | 50,302 | 26,802 | 44,725 | 1,55,266 | 585,370 | 109,911 | 947,684 | 140,228 |
| Grand Trunk Western..... | 8,170 | 17,078,711 | 4,467,332 | 23,705,541 | 2,845,913 | 300,581 | 6,034,253 | 261,909 | 295,967 | 25,967 | 1,23,456,688 | 11,399,853 | 1,382,537 | 9,976,363 | 9,976,363 |
| Illinois Central & Great Northern..... | 308 | 3,116,990 | 893,019 | 4,20,278 | 780,909 | 86,351 | 83,247 | 1,30,476 | 1,30,476 | 1,30,476 | 1,30,476 | 1,30,476 | 1,30,476 | 1,30,476 | 1,30,476 |
| Indiana Harbor Belt..... | 109 | 712,202 | 2,794,517 | 4,407,987 | 229,908 | 547,564 | 25,336 | 630,892 | 25,336 | 52,159 | 51,346 | 1,484,845 | 923,142 | 73,342 | 73,342 |
| International & Great Northern..... | 1,160 | 1,947,070 | 455,996 | 2,407,987 | 229,908 | 547,564 | 48,301 | 560,528 | 560,528 | 13,694 | 52,159 | 875,669 | 98,453 | 77,610 | 377,210 |
| Kanawha & Michigan..... | 895 | 1,454,882 | 455,996 | 2,031,528 | 230,644 | 230,644 | 230,644 | 48,301 | 48,301 | 48,301 | 48,301 | 48,301 | 48,301 | 48,301 | 48,301 |
| Kansas City, Mex. & Orient Ry. of Texas..... | 837 | 271,381 | 57,141 | 347,451 | 56,842 | 67,802 | 4,567,589 | 4,567,589 | 4,567,589 | 4,567,589 | 4,567,589 | 4,567,589 | 4,567,589 | 4,567,589 | 4,567,589 |
| Kansas City, Southern..... | 900 | 1,656,135 | 220,987 | 1,939,668 | 2,890,375 | 290,776 | 308,475 | 41,720 | 80,898 | 80,898 | 10,898 | 10,898 | 10,898 | 10,898 | 10,898 |
| Lake Erie & Western..... | 97 | 515,775 | 30,715 | 599,991 | 82,845 | 101,328 | 4,551 | 6,122 | 197,136 | 197,136 | 197,136 | 197,136 | 197,136 | 197,136 | 197,136 |
| Lehigh & New England..... | 296 | 674,755 | 3,901,750 | 255,979 | 120,455 | 106,120 | 2,470,054 | 250,339 | 250,339 | 250,339 | 250,339 | 250,339 | 250,339 | 250,339 | 250,339 |
| Long Island & Salt Lake..... | 1,154 | 1,887,669 | 844,211 | 1,939,321 | 1,34,603 | 1,21,455 | 406,338 | 406,338 | 406,338 | 406,338 | 406,338 | 406,338 | 406,338 | 406,338 | 406,338 |
| Los Angeles & Arkansas Navigation Co. | 279 | 3,02,206 | 55,478 | 370,513 | 30,715 | 599,991 | 82,845 | 423,811 | 423,811 | 423,811 | 423,811 | 423,811 | 423,811 | 423,811 | 423,811 |
| Louisiana Railway & Navigation Co. | 350 | 429,505 | 130,600 | 550,232 | 107,114 | 92,197 | 81,333 | 154,522 | 154,522 | 154,522 | 154,522 | 154,522 | 154,522 | 154,522 | 154,522 |
| Louisiana Western..... | 208 | 401,703 | 188,305 | 626,878 | 66,857 | 93,293 | 355,370 | 4,629,493 | 57,367 | 36,187 | 10,708,873 | 5,439,376 | 651,376 | 4,785,757 | 123,677 |
| Louisiana Western..... | 5,071 | 11,618,945 | 16,14,249 | 2,22,043 | 3,1,18,369 | 84,729 | 10,651 | 1,572,633 | 1,572,633 | 1,572,633 | 1,572,633 | 1,572,633 | 1,572,633 | 1,572,633 | 1,572,633 |
| Louisville, Henderson & St. Louis..... | 200 | 285,059 | 1,24,101 | 436,459 | 84,729 | 10,651 | 1,572,633 | 1,572,633 | | | | | | | |

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF FISCAL YEAR, 1917—CONTINUED

| Average mileage operated during period. | Operating revenues— | | | Operating expenses— | | | | | | Net from railway operation. | Railway tax accreas. | Operating income (or loss). comp. with last year. | |
|--|---------------------|-------------|-----------------------|------------------------------|------------------------|-------------|----------------------|---------------------|-------------|--------------------------------------|----------------------------|---|--|
| | Freight. | Passenger. | Total (inc. misc.) | Maintenance of Equipment. | Way and structures. | Traffic. | Transporta- tion. | Miscel- laneous. | General. | Total. | | | |
| 7/17 Name of road. | | | | | | | | | | | | | |
| Mobile & Ohio | 1,160 | \$2,394,798 | \$376,720 | \$2,941,025 | \$382,344 | \$708,812 | \$108,140 | \$991,333 | \$2,291,196 | \$115,192 | \$534,142 | —\$2,958 | |
| Monongahela Connecting | 108 | 461,720 | 31,399 | 50,985 | 81,144 | 32,228 | 2,192 | 111,339 | 1,245 | 239,625 | 243,625 | —20,302 | |
| Monongahela & Texas R. R. & S. Co. | 6 | 800,163 | 266,154 | 1,169,658 | 482,285 | 44,246 | 900 | 167,685 | 8,764 | 269,880 | 63,599 | —98,708 | |
| Morgan's La. & Texas R. R. & St. Louis | 401 | 2,343,261 | 817,482 | 3,412,648 | 404,011 | 218,596 | 33,246 | 396,327 | 6,577 | 305,542 | 69,050 | —115,871 | |
| Nashville, Chattanooga & St. Louis | 1,237 | 2,343,261 | 817,482 | 3,412,648 | 639,308 | 156,688 | 15,826 | 108,615 | 2,455,964 | 936,383 | 86,500 | 237,427 | |
| Nevada Northern | 165 | 493,847 | 37,663 | 546,480 | 66,653 | 14,300 | 2,024 | 82,539 | 250 | 1,380 | 206,281 | 321,255 | |
| New Orleans & North Eastern | 204 | 700,184 | 165,004 | 846,261 | 45,648 | 12,404 | 2,024 | 87,563 | 264,166 | 19,806 | 46,014 | 68,604 | |
| New Orleans Great Northern | 285 | 352,964 | 89,030 | 464,261 | 76,227 | 12,404 | 1,884 | 88,509 | 315 | 19,875 | 160,486 | 49,126 | |
| New Orleans, Mobile & Chicago | 402 | 396,498 | 84,772 | 492,255 | 302,778 | 53,759 | 13,816 | 84,039 | 19,571 | 232,006 | 70,771 | 48,376 | |
| New Orleans, Texas & Mexico | 191 | 223,136 | 1,387,182 | 84,772 | 355,967 | 76,227 | 13,816 | 84,039 | 19,571 | 232,006 | 70,771 | 48,376 | |
| New York Central Railroad | 6,993 | 34,834,158 | 15,551,637 | 58,695,434 | 5,855,828 | 9,706,029 | 894,119 | 149,975 | 1,247,432 | 36,215,024 | 22,480,410 | 2,264,399 | |
| New York, Chicago & St. Louis | 571 | 3,117,213 | 4,496,983 | 21,222,713 | 2,433,234 | 2,611,242 | 133,562 | 1,457,135 | 16,235 | 506,334 | 13,512,322 | 7,10,391 | |
| New York, New Haven & Hartford | 2,005 | 10,000,182 | 8,494,596 | 21,222,713 | 2,433,234 | 2,449 | 1,457,135 | 1,557,63 | 276,943 | 1,982,153 | 2,940,109 | 75,000 | |
| New York, Ontario & Western | 568 | 1,387,168 | 931,093 | 2,433,234 | 355,829 | 14,118 | 466,946 | 15,534 | 33,816 | 55,446 | 42,000 | 447,081 | |
| New York, Philadelphia & Norfolk | 112 | 1,166,472 | 1,423,794 | 1,167,618 | 1,423,794 | 121,269 | 1,423,794 | 355,971 | 312,334 | 251,506 | 6,692,905 | 6,692,905 | |
| New York, Susquehanna & Western | 140 | 538,599 | 150,797 | 733,238 | 68,681 | 1,00,481 | 18,622 | 1,00,481 | 6,094 | 355,971 | 378,931 | 40,044 | |
| Norfolk & Western | 2,086 | 12,935,741 | 1,685,459 | 15,620,316 | 2,100,461 | 184,857 | 188,967 | 25,153 | 30,330 | 82,905 | 1,419,564 | 8,505,302 | |
| Norfolk Southern | 908 | 2,776,397 | 1,271,861 | 2,131,836 | 184,857 | 188,967 | 25,153 | 30,330 | 82,905 | 1,419,564 | 8,505,302 | 1,629,241 | |
| Northern Pacific | 6,505 | 15,255,351 | 4,17,602 | 21,349,766 | 2,967,312 | 2,133,067 | 16,155,217 | 2,133,067 | 2,680 | 2,680 | 5,456,579 | 6,930,703 | |
| Oahu Railway & Land Co. | 114 | 344,658 | 64,539 | 430,664 | 52,346,638 | 33,819 | 64,211 | 98,185 | 2,566 | 86,560 | 1,682,953 | 1,045,704 | |
| Oregon Short Line | 2,254 | 5,245,202 | 1,404,400 | 6,649,600 | 1,632,462 | 829,335 | 510,329 | 1,632,462 | 73,480 | 33,906 | 1,935,017 | 1,935,017 | |
| Oregon-Washington R. R. & Nav. Co. | 2,070 | 1,138,518 | 1,32,462 | 1,173,474 | 24,427,734 | 2,53,335 | 224,649 | 14,421,272 | 6,539,444 | 114,837 | 3,299,521 | 1,934,477 | |
| Parahandale & Santa Fe | 1,755 | 15,596,834 | 3,47,018 | 21,441,974 | 2,427,734 | 3,350,296 | 24,427,734 | 2,427,734 | 2,680 | 14,421,272 | 3,299,521 | 1,934,477 | |
| Pennsylvania Company | 114 | 344,658 | 64,539 | 430,664 | 52,346,638 | 33,819 | 64,211 | 98,185 | 2,566 | 86,560 | 1,682,953 | 1,045,704 | |
| Pennsylvania Railroad | 19 | 33,323 | 13,596 | 48,826 | 5,298,530 | 5,59,185 | 1,040,445 | 106,955 | 1,887,616 | 17,317 | 3,769,590 | 3,769,590 | |
| Pearl River Union | 2,249 | 3,829,816 | 1,393,803 | 5,298,530 | 1,040,445 | 1,040,445 | 1,040,445 | 1,040,445 | 1,040,445 | 1,040,445 | 6,427,722 | 6,427,722 | |
| Pere Marquette | 1,127 | 12,118,672 | 1,951,234 | 14,044,903 | 1,034,449 | 1,274,148 | 86,644 | 2,491,015 | 1,550 | 3,08 | 163,952 | 184,598 | |
| Philadelphia & Reading | 88 | 2,358,839 | 2,358,839 | 6,718,272 | 6,718,272 | 6,718,272 | 6,718,272 | 6,718,272 | 6,718,272 | 6,718,272 | 1,420,406 | 1,420,406 | |
| Philadelphia, Baltimore & Washington | 717 | 3,538,839 | 2,358,839 | 5,911,640 | 568,253 | 951,247 | 1,040,453 | 1,040,453 | 1,040,453 | 1,040,453 | 973,644 | 973,644 | |
| Pittsburgh & Lake Erie | 225 | 5,419,684 | 1,271,861 | 6,692,551 | 1,245,541 | 1,841,974 | 2,442,686 | 2,442,686 | 2,442,686 | 2,442,686 | 1,475,971 | 30,000 | |
| Pittsburgh, Cincinnati, Chic. & St. Louis | 1,489 | 9,120,576 | 2,671,651 | 11,782,232 | 2,027,486 | 7,154,132 | 11,407,088 | 63,988 | 19,903 | 1,475,971 | 2,910,391 | 1,422,184 | |
| Pittsburgh, Shawmutt & Northern | 205 | 482,065 | 26,607 | 508,162 | 271,423 | 800,211 | 24,134 | 90,403 | 1,275,539 | 1,275,539 | 1,679,391 | 1,679,391 | |
| Port Reading | 21 | 386,162 | 271,423 | 881,727 | 321,423 | 321,423 | 321,423 | 321,423 | 321,423 | 321,423 | 205,397 | 205,397 | |
| Richmond, Frederickburg & Potomac | 88 | 503,392 | 271,423 | 881,727 | 321,423 | 321,423 | 321,423 | 321,423 | 321,423 | 321,423 | 230,408 | 230,408 | |
| St. Joseph & Grand Island | 258 | 456,961 | 389,982 | 874,948 | 1,09,094 | 645,538 | 1,081,317 | 131,413 | 166,401 | 32,289 | 33,958 | 97,364 | |
| St. Louis, San Francisco & St. Louis | 4752 | 9,033,662 | 3,536,313 | 13,384,953 | 1,820,673 | 1,90,260 | 70,285 | 130,066 | 1,550 | 1,550 | 3,060,455 | 3,357,949 | |
| St. Louis, Brownsville & Mexico | 548 | 766,541 | 570,694 | 1,420,021 | 1,163,543 | 32,163 | 47,290 | 113,250 | 113,250 | 113,250 | 1,415,946 | 1,415,946 | |
| St. Louis, Iron Mountain & Southern | 3,555 | 6,619,940 | 1,921,798 | 8,536,556 | 458,524 | 32,163 | 47,290 | 113,250 | 113,250 | 113,250 | 1,415,946 | 1,415,946 | |
| St. Louis, San Francisco & Texas | 943 | 1,652,700 | 428,189 | 2,027,267 | 1,269,932 | 155,913 | 2,027,267 | 1,269,932 | 1,269,932 | 1,269,932 | 2,466,621 | 2,466,621 | |
| St. Louis, Southwestern of Texas | 811 | 880,464 | 296,757 | 1,172,843 | 166,218 | 1,457,947 | 2,442,347 | 2,442,347 | 2,442,347 | 2,442,347 | 1,475,971 | 1,475,971 | |
| St. Louis & Arkansas Pass | 726 | 793,663 | 316,486 | 1,172,843 | 166,218 | 1,457,947 | 2,442,347 | 2,442,347 | 2,442,347 | 2,442,347 | 1,475,971 | 1,475,971 | |
| Seaboard | 3,449 | 12,089,656 | 1,292,449 | 14,747,491 | 1,850,620 | 2,788,935 | 2,869,384 | 2,869,384 | 2,869,384 | 2,869,384 | 1,384,927 | 1,384,927 | |
| Southern in Mississippi | 281 | 157,995 | 87,830 | 267,091 | 267,091 | 267,091 | 267,091 | 267,091 | 267,091 | 267,091 | 95,163 | 95,163 | |
| Southern in Missouri | 6,949 | 22,932,856 | 7,914,238 | 33,632,863 | 3,017,535 | 4,798,470 | 3,017,535 | 4,798,470 | 3,017,535 | 3,017,535 | 10,532 | 10,532 | |
| Spokane, Portland & Seattle | 555 | 877,834 | 473,764 | 1,490,906 | 172,656 | 295,780 | 295,780 | 295,780 | 295,780 | 295,780 | 302,996 | 109,542 | |
| Tennessee Central Railroad Ass'n. of St. Louis | 295 | 303,638 | 119,752 | 295,399 | 1,23,124 | 233,124 | 233,124 | 233,124 | 233,124 | 233,124 | 302,996 | 109,542 | |
| Texas & Pacific | 436 | 1,448,307 | 1,393,803 | 2,148,707 | 1,70,558 | 1,68,603 | 1,68,603 | 1,68,603 | 1,68,603 | 1,68,603 | 2,148,707 | 2,148,707 | |
| Toledo, Ohio & Central | 248 | 172,367 | 111,479 | 308,134 | 51,940 | 87,519 | 7,515 | 108,717 | 2,645 | 2,645 | 1,127,667 | 1,127,667 | |
| Toledo, Peoria & Western | 451 | 1,70,813 | 168,503 | 354,553 | 45,208 | 49,194 | 49,194 | 49,194 | 49,194 | 49,194 | 1,422,446 | 1,422,446 | |
| Tulier & Delaware | 129 | 117,495 | 1,36,818 | 3,164,997 | 18,608,480 | 2,741,950 | 2,741,950 | 2,741,950 | 2,741,950 | 2,741,950 | 1,04,931 | 1,04,931 | |
| Union Railroad of Baltimore | 8 | 420,408 | 78,264 | 504,096 | 36,839 | 280,425 | 280,425 | 280,425 | 280,425 | 280,425 | 1,04,931 | 1,04,931 | |
| Vandalia "Shreveport & Pacific | 171 | 2,279,903 | 723,820 | 3,388,856 | 551,613 | 637,779 | 71,122 | 1,10,028 | 33,856 | 33,856 | 1,04,931 | 1,04,931 | |
| Vicksburg, Shreveport & Pacific | 510 | 1,855,984 | 141,441 | 2,146,476 | 9,584,564 | 1,01,10,081 | 1,481,939 | 272,278 | 3,218,349 | 2,67,430 | 2,67,430 | 1,04,931 | |
| Virginia | 2,519 | 6,646,146 | 2,146,476 | 9,584,564 | 1,01,10,081 | 1,481,939 | 272,278 | 3,218,349 | 2,67,430 | 2,67,430 | 1,04,931 | 1,04,931 | |
| Wabash | 63 | 322,673 | 27,710 | 376,303 | 39,195 | 56,637 | 5,637 | 93,834 | 5,822 | 13,195 | 223,608 | 223,608 | |
| Washington Southern | 36 | 167,623 | 159,418 | 422,786 | 422,786 | 422,786 | 422,786 | 422,786 | 2,795 | 10,993 | 1,187,950 | 1,187,950 | |
| West Jersey & Seashore | 359 | 621,120 | 2,06,255 | 2,06,255 | 2,892,637 | 3,91,343 | 3,91,343 | 3,91,343 | 3,91,343 | 3,91,343 | 1,04,931 | 1,04,931 | |
| Western Maryland | 689 | 2,623,335 | 3,192,339 | 3,192,339 | 3,192,339 | 3,192,339 | 3,192,339 | 3,192,339 | 3,192,339 | 3,192,339 | 1,04,931 | 1,04,931 | |
| Western Pacific | 133 | 1,742,743 | 105,608 | 2,149,743 | 2,149, | | | | | | | | |

"Arkansas on Wheels"

The exhibition train, which recently made the run "around the circle" of 14 states to advertise Arkansas, and which stopped at 42 cities and towns, reached every night stop ahead of time. The train started from Little Rock October 17. It was in charge of W. B. Folsom, T. E. Wood and H. M. Gregory. The train, of 10 steel cars, was made up of five baggage cars for exhibition purposes, and four Pullmans and a dining car for the accommodation of its 118 passengers. It traveled 3,600 miles in 13 days, traveling only by daylight; stayed two days in Washington, one in Richmond and one in St. Louis, and the 42 exposition stops were of from 30 minutes to two hours long. From 500 to 8,000 people viewed the exhibits at each stop. The lines traversed were the Rock Island, the Frisco, the Southern, the Richmond, Fredericksburg & Potomac, the Baltimore & Ohio, the Big Four and the Missouri Pacific.

The Goethals Commission

The Federal Commission, appointed by President Wilson to investigate the workings of the Adamson Eight Hour bill and to report to Congress, held its first informal conference in New York City November 23, and met Robert S. Lovett, chairman of the Union Pacific; Hale Holden, president of the Burlington; Daniel Willard, president of the Baltimore & Ohio; W. H. Truesdale, president of the Lackawanna; W. W. Atterbury, vice-president of the Pennsylvania; B. F. Bush, receiver for the Missouri Pacific; L. F. Loree, president of the Delaware & Hudson, and F. D. Underwood, president of the Erie. This week the commissioners were to meet the heads of the four brotherhoods. The members of the commission are Major-General George W. Goethals, retired, chairman; Edgar E. Clark, member of the Interstate Commerce Commission, and George Rublee, member of the Federal Trade Commission. Dr. Max O. Lorenz, assistant statistician of the Interstate Commerce Commission, is secretary.

Report on Knobmount Collision

The Interstate Commerce Commission has issued a report, dated October 24, giving the conclusions of H. W. Belnap, chief of the division of safety, on a butting collision on the Western Maryland, October 12, last, near Knobmount, W. Va. (which is within the yard limits of Cumberland). Two employees were killed and thirteen passengers and seventeen employees were injured. The westbound train consisted of an engine and two cars, carrying employees to their work, about 7 a. m. The eastbound was an excursion train, running as an extra; and the collision occurred within yard limits. There was a dense fog at the time. The employees' train had no rights, except those of a yard engine, and it was running about 15 minutes later than its usual time. The despatcher's order carried by the extra was No. 21, and gave it the right to the road, as an extra train, to Knobmount Tower, a short distance within the yard limits. By a second order, No. 22, the despatcher ordered it to "use passenger speed, W. V., to Knobmount Tower." The extra entered within yard limits not under control and almost immediately met the employees' train. As an extra, the excursion was bound to run under control within yard limits; but the conductor and the engineman, at the hearing, claimed that their second order, authorizing passenger speed, was understood by them to mean that they could maintain that speed fully up to the tower; and that the yard engine would keep out of their way.

The despatcher said that he gave right of road to the tower so as to expedite the movement of the excursion train, but without intending to relieve it from observing yard-limit rules. The assistant chief despatcher, who had had some discussion with the despatcher as to running this train, said that he had intended to have both orders terminate at the entrance to the yard; and that not until after the collision did he know that the right of road had been given so far as the tower.

The inspector holds mainly responsible the men in charge of the excursion train—the trainmaster was on the train—but says that the despatcher exercised exceedingly poor judgment in issuing orders which might easily mislead or confuse the man in charge of the train. The trainmaster is held at fault for not having ordered the use of standard form G 3, by which the despatcher gives an extra a schedule. The assistant chief despatcher is also censured in this connection; and these officers

are charged with maintaining "an attitude of indifference with regard to the operation of this excursion train; . . . the lack of ordinary precautions and safeguards surrounding its operation is disconcerting and to be deplored." The decision to run this train had been reached a week before, but no bulletin had been issued to employees. It is held that with an order of form G 3, the rights of a train are more clearly defined than under the orders issued in this instance; and had form G 3 been used, a "much greater degree of protection would have been afforded." All of the employees were experienced and they had been on duty only a short time.

Valuation of the N. O. T. & M.

The Interstate Commerce Commission has submitted a tentative valuation report on the New Orleans, Texas & Mexico Railroad. The division of valuation finds the total cost of reproduction, new, as \$8,865,636, and the cost of reproduction, less depreciation, as \$7,572,886. These figures include refrigerator cars owned by the New Orleans, Texas & Mexico, but used by the St. Louis & San Francisco, as to which the commission finds the cost of reproduction, new, as \$1,196,661, the cost of reproduction, less depreciation, as \$1,100,902, and the original cost as \$1,196,661. The total capitalization of the road on the date of the valuation is given as \$40,938,031. The report says that the company is the creditor of affiliated carriers for advances and interest due amounting, as shown by the records as restated by the commission, to \$21,368,179. The present value of these items, it is stated, cannot now be determined. The original cost to date of road and equipment shown by the records as rewritten by the commission amounts to \$12,194,231. This amount, the report says, has been unduly increased by the inclusion therein of certain items which are not fully approved, including an item of \$849,608 paid to the Gulf Construction Company by the Colorado Southern, New Orleans & Pacific for the construction of part of the line and which, the report states, "can be accounted for only on the theory that it was profit realized by the Gulf Construction Company."

Objection is also made to the method of calculation of interest during construction, and the record cost of road and equipment is said to be unduly large. No report is made as to the original cost, except for the item of equipment, which is placed at \$2,888,363. On June 30, 1914, the date for which the report is made, the company owned 228.39 miles of line and operated 341.54 miles. It has since been reorganized as the New Orleans, Texas & Mexico Railway. The company and other interested parties are given 30 days from December 1 in which to file a protest.

American Society of Mechanical Engineers

The annual meeting of the American Society of Mechanical Engineers will be held in the Engineering Societies building, New York, December 5 to 8.

The railroad session will be held Friday morning, December 8, at 10 a. m., and papers will be read as follows: Clasp Brakes for Heavy Passenger Cars, by T. L. Burton; Pulverized Fuel for Locomotives, by J. E. Muhlfeld; Mechanical Design of Electric Locomotives, by A. F. Batchelder. Mr. Batchelder's paper will be found elsewhere in this week's issue. A copy of Mr. Burton's paper appeared in the *Railway Age Gazette* of November 10.

Many other papers of interest to railway men will be read at the several sessions. Among these are the following:

The presidential address by Dr. D. S. Jacobus, on the Relation of Education to Engineering will be made Tuesday evening at 8:30, and will be followed by a reception.

At the Miscellaneous Session, at 11:30 a. m., on December 6, among others, will be papers on the following subjects: Water for Steam Boilers—Its Significance and Treatment, by Arthur C. Scott and J. R. Bailey; Steam Safety Valves, by George H. Clark; Standardization of Power Plant Operating Costs, by Walter N. Polakov; Bearing Lubrication, by Boynton M. Green.

At the Industrial Safety Session, to be held at the same time, a report will be presented on Safety Standards for the Operation of Cranes. At the Miscellaneous Session, at 2 p. m., the same day, papers will be presented, among others, on: The Utilization of Waste Heat for Steam-Generating Purposes, by Arthur D. Pratt; Graphic Methods of Analysis in the Design and Operation of Steam Power Plants, by R. J. S. Pigott; and Power Plant Efficiency, by Victor J. Azbe.

At the Machine Shop Session, the same time, papers will be read by Carl G. Barth on the Standardization of Machine Tools, and by H. K. Hathaway, on a Proposed Plan for the Activities of the Machine Shop Section of the American Society of Mechanical Engineers.

On Thursday, December 7, there will be a Valuation Session at 10 a. m., second Valuation Session at 2 p. m., and a Gas Power Session also at 2 p. m. At the Valuation sessions the following papers will be presented: Accurate Appraisals by Short Methods, by J. G. Morse; How Does Industrial Valuation Differ from Public Utility Valuation?, John H. Gray; and Relation Between Perpetual Inventory Value and Appraisal Value, by Charles Prez.

Valuation of Industrial Properties vs. Valuation of Industrial Methods, by Walter N. Polakov; Productive Capacity a Measure of Value of an Industrial Property, by H. L. Gantt.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meetings.

AIR BRAKE ASSOCIATION.—F. M. Nellis, Room 3014, 165 Broadway, New York City. Next annual convention, May 1-4, 1917, Memphis, Tenn.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, January, 1917, New York.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October, 1917, San Francisco, Cal.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill. Next meeting, June, 1917, Denver.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConaughy, 165 Broadway, New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, general secretary, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 16-18, 1917, St. Paul, Minn.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 20-22, 1917, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Next meeting, June, 1917, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—Owen D. Kinsey, Illinois Central, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meeting, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next convention, December 5-8, 1916, Engineering Societies' Bldg., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, Supt. Timber Preservation, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 23-25, 1917, New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, Rooms 1116-8 Woodward Bldg., Washington, D. C. Annual meeting, May 30, 1917, Richmond, Va.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Semi-annual meeting with Master Car Builders' Association.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, Terminal Station, Central of New Jersey, Jersey City, N. J. Next meeting, May, 1917, Louisville, Ky.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreuccetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—W. L. Connely, Superintendent of Telegraph, Indiana Harbor Belt, Gibson, Ind. Next annual meeting, September 18-20, 1917, Washington, D. C.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 12-13, 1916, Ansley Hotel, Atlanta, Ga.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—Tom Lehon, The Lehon Company, Chicago. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual dinner, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. R. McMurn, New York Central, Albany, N. Y.

CINCINNATI RAILWAY CLUB.—H. Boutet, Chief Interchange Inspector, Cin'ti Rys., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati. ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Traffic Manager, R. F. & P., Richmond, Va. Annual convention, June 19, 1917, Banff, Alberta.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Wood-Worth, C. H. & D., Lima, Ohio. Next annual meeting, August, 1917, Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, C. B. & O. R. R., 702 E. 51st St., Chicago. Next meeting, May 14-17, 1917, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMAN'S ASSOCIATION.—Wm. Hall, 1126 W. Broadway, Winga, Minn.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—F. W. Hager, Fort Worth & Denver City, Fort Worth, Tex.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next annual meeting, September 11, 1917, Chicago.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Next meeting, June, 1917, Atlantic City, N. J.

NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS.—Wm. H. Connolly, 1319 Columbia Road, Washington, D. C. Next annual convention, October 16, 1917, Washington, D. C.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, 349 Peoples Gas Bldg., Chicago. Next convention, March, 1917, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York.

Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—F. C. Stewart, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, January 16, 1917, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Pittsburgh Commercial Club Rooms, Colonial-Annex Hotel, Pittsburgh.

RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welty, Commissioner of Agriculture, St. L., Iron Mt. & So., 1047 Railway Exchange Bldg., St. Louis. Annual meeting, May 9-11, 1917, Louisville, Ky.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Office of the President's Assistant, Seaboard Air Line, Norfolk, Va.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, Assistant Engineer, C. & O., Richmond, Va. Next convention, October, 1917, Duluth, Minn.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Next annual convention, September, 1917, Atlantic City, N. J.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders' and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W., Sterling, Ill. Next annual convention, September 18-21, 1917, Chicago.

ST. LOUIS RAILWAY CLUB.—R. W. Fraenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, N. & W., Philadelphia, Pa.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boddy House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Gen'l Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next meeting, June 19, 1917, Fresno, Cal.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELLING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Cleveland, Ohio.

WESTERN ASSOCIATION OF SHORT LINE RAILROADS.—Clarence M. Oddie, Mills Bldg., San Francisco.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Monday in month, except June, July and August, Hotel Sherman, Chicago.

Traffic News

Freight agents in Newark, N. J., and in other places, are notifying consignees that bulk freight not unloaded within ten days from arrival will be summarily removed to storehouses.

J. T. Money, examiner of the Interstate Commerce Commission held a hearing in New York City this week in a proceeding begun by the Lehigh Valley Coal Sales Company against the Lehigh Valley Railroad Company to recover \$320,658 which the complainant alleges was paid in excess of the present freight rates on coal carried by the railroad company.

Arthur Hale, who, up to last March, was chairman of the Committee on Relations Between Railroads of the American Railway Association, and who then resigned to take a position with the Consolidation Coal Company, has been elected vice-president of that company, in charge of transportation and traffic. His office is at Baltimore, Md. A sketch of Mr. Hale's life was given in the *Railway Age Gazette* of March 24, last, page 698.

The Federal grand jury for the western district of Arkansas recently returned four indictments each, on 25 counts, for violations of the interstate commerce law, as follows: Against the Louisiana & Arkansas for granting concessions on shipments of yellow pine logs and against the Bodcaw Lumber Company for receiving concessions from the Louisiana & Arkansas; against the St. Louis Southwestern for granting rebates on lumber shipments, and against the Louisiana & Arkansas and William Buchanan, president, for receiving rebates from the St. Louis Southwestern.

The Traffic Club of Kansas City held its annual election on November 7, the following officers being named: President, James Spencer Adsit, general agent, Chicago, Milwaukee & St. Paul; first vice-president, George I. Tompkins, vice-president and general manager, Missouri-Interstate Paper Company; second vice-president, R. M. Ritchey, general agent, St. Joseph & Grand Island; secretary-treasurer, Alfred A. Wild, traffic manager, Merchants' Association. The annual banquet of the club took place at Hotel Muehlbach on November 15, 250 members and guests being present. Among the speakers were E. F. Kearney, president of the Wabash, who discussed "Modern Politics and Transportation."

As a result of a conference between the Public Utilities Commission of Illinois, the railroads and coal and grain shippers at Springfield, on November 22, the ruling of the commission that cars be distributed in proportion to the number used by individual shippers over a period of four years was definitely suspended. The carriers have been given a week in which to file briefs, and the other interests a week in which to file briefs in reply, following which another conference will be held for the purpose of coming to some agreement as to the proper method of car distribution.

H. C. Barlow, freight claim adjuster of the Erie, has prepared a 16-page booklet entitled "Links in the Chain of Transportation," for distribution among all employees concerned in the movement of freight from the time of its receipt until its delivery. In his foreword Mr. Barlow states that inasmuch as a chain is no stronger than its weakest link, each link in the chain by which a shipment passes from a shipper to a consignee must be constantly watched and guarded to insure no breaking down of the machinery. In the remainder of the pamphlet he enumerates 12 distinct links, emphasizing the importance of the proper execution of each.

In Georgia, where railroad officers and shippers have been spending many weeks in hearings and discussions before the State Railroad Commission, which is investigating the propriety of a general advance in intrastate freight rates, and which hearings have now been suspended for a few weeks, attention is now centered on a hearing by the Interstate Commerce Commission, which seems to be equally extensive. Commissioner Clements, sitting at Atlanta, is listening to a general complaint, headed

by the Atlanta Freight Bureau, concerning advances which have been made in the rates on freight from western, northern and southwestern points to the cities in Georgia.

A. R. A. Car Orders

The Conference Committee on Car Efficiency, sitting at Washington, reports that there is a great excess of box cars in the northeastern quarter of the United States. Roads which have in use more box cars than they own have been called upon to send the excess of cars, loaded or empty, toward the roads which have less than their ownership of cars. In carrying out this order cars must be routed homeward to the greatest extent consistent with a quick accomplishment of the required relief.

The committee has announced that railroads in the Northwest have agreed to put into coal-carrying service about 16,500 ore cars. According to the conference committee's record the New York Central on November 1 had 9,732 more cars in service than it owned; the Pennsylvania 30,963, and the Boston & Maine, 11,118. Group 2 has an excess of 73,263.

Demurrage

Applications for authority to issue a new demurrage tariff, identical with that recently submitted to the Interstate Commerce Commission, are being made by the railroads to the state railway commissions. As recently noted in the *Railway Age Gazette*, the commissions of Colorado and Kansas have granted an increase in demurrage charges and the Public Utilities Commission of Illinois has been conducting hearings on the subject. The State Corporation Commission of New Mexico has authorized a straight demurrage charge of \$3 a day after the expiration of free time, effective November 1, which is the same rate granted by the Public Utilities Commission of Colorado. The commissions of Oregon and Nebraska had hearings on the proposed new rates beginning November 24, and the following commissions will have hearings beginning on the dates specified: Wyoming, December 4; Iowa, December 5; Arkansas, December 7; Missouri, December 18.

The railroad commissions of South Carolina and of Florida have held a number of hearings to investigate the car shortage.

Illinois Coal-Car Problems

The Public Utilities Commission of Illinois on Tuesday issued an order requiring all railroads to return coal cars, received in intrastate traffic, to the owning roads immediately after they are emptied. The commission has also called a special meeting, to be held at Chicago this week, of carriers and coal dealers, to consider a proposed increase in demurrage and reconsignment charges to apply only to coal traffic. The carriers have proposed the same demurrage schedule that was suspended by the Interstate Commerce Commission and they propose changes in the reconsignment rules as follows: A charge of \$2 per car if the reconsignment order is filed with the company before the arrival of the car at its original destination; \$5 if the car is held at an intermediate point for orders and reconsigned therefrom; \$5 if consigned within 24 hours after arrival at destination or at a terminal yard serving the destination station. Only one reconsignment, on a through rate, will be permitted after the shipment reaches its original destination. It is provided also that this coal traffic be subject to demurrage at a reconsigning point after the expiration of the usual free time period. It is believed that the commission will reach a decision this week and that an order will soon be issued.

Lumber Association Wants to Retain Reconsignment Privileges

The Lumbermen's Association of Chicago has published a brief on reconsignment and diversion in connection with the case before the Interstate Commerce Commission entitled "In the matter of rates on, and classification of lumber and lumber products, No. 8131," on which protracted hearings were recently held in Chicago. The association argues that the curtailment of reconsigning privileges on cars loaded with lumber would prove disastrous to small lumber manufacturers, and would concentrate the control of the lumber market in the hands of the large producers. At the present time small mill operators set up portable mills in scattered patches of yellow pine, owned by farmers or settlers desirous of clearing the land. A landowner

has the choice of killing his trees and burning the stumps or selling his timber holdings to small operators. To kill the trees they are merely girdled and left to die, usually being blown down and burned. But the mill operator, by setting up a small portable mill, can conserve the timber for the market. Small operators also operate in cut-over land where the timber of standard sizes has been already cut by the large manufacturers. It is not possible for the small operator to cut to order, as he must saw his timber into such miscellaneous sizes as conditions may permit. Furthermore, he is not able to secure empty cars as readily as the large manufacturer, and therefore must suit the time of the shipment of his product to the arrival of empty cars at his plant. In periods of car shortage the transit car of the small operator is disposed of quickly to fill in the stocks of large wholesalers in odd sizes, which could not be obtained otherwise, except by placing a specific order with a large manufacturer—a proceeding which would consume time.

The brief further claims that many errors are prevented by the shippers' practice of reconsigning and diverting. The statement is made that probably less than 50 per cent of the expense bills covering lumber shipments today show gross, tare and net weights, so as to allow shippers to be assured of stake allowance, but by having the car billed to a regular reconsigning point or to a terminal, shippers may insist upon this information being furnished before the car is delivered. That such insistence is justifiable is recognized by the action of weighing associations in practically refusing to recognize weight claims unless supported by at least one re-weight and sometimes by two or three re-weights. In this way many claims will be prevented which are too costly for the carriers to investigate. Further than this, the billing of cars to reconsigning points is in itself valuable as preventing one carrier from discriminating against another by misrouting, which is often followed.

Abuse of Reconsignment by Coal Dealers

That coal brokers and mine operators are using the car shortage as an excuse to break their contracts and sell coal at higher prices on the open market is being confirmed. A large Michigan company, reincorporated about a year ago, was offered prompt delivery of "free" coal, under its old corporate name, by the same mine which, on the grounds of car shortage, refused to deliver its contract coal. A large miner of silica in Illinois reported to the State Public Utilities Commission that although he was able to secure cars sufficient to ship his product to glass manufacturers (an average of 20 cars a day), he had been forced to shut down repeatedly because of his inability to get deliveries of contract coal from a mine only six miles distant. On the other hand, he has experienced no difficulty whatsoever in securing prompt delivery of "free" coal at greatly advanced prices.

Recent investigation, by the Illinois commission, of railroad freight yards in Chicago have disclosed the fact that large numbers of cars loaded with coal are being held for reconsignment for periods ranging from a few days to several weeks. On the 22nd of November 215 loaded cars were found in the Wildwood (Chicago) yards of the Illinois Central, which had been held from 1 to 19 days. On the same day, 108 loaded cars were found in the yards of the Chicago & Alton, which had been detained for reconsignment for similar periods. It has been conservatively estimated by those in close touch with the situation that at least 500 cars may be found in Chicago yards any day which have been detained an average of seven days each. It is obvious that with coal which formerly sold at 90 cents a ton now selling at three times that much and steadily advancing in price, every incentive exists to hold the cars until their lading can be disposed of to advantage at open market prices. It has been found that detention is not only practiced by large coal mine operators and established brokers, but by "shoe-string" brokers, without capital or offices, who buy loaded cars in the yards and hold them until they can be resold at a profit.

Another interesting discovery of the Illinois commission is that coal shippers are making false complaints regarding their failure to secure cars, in the hope of receiving more cars than the pro rata system of distribution permits. One coal shipper, who reported that he had received only one empty car in nine days, was found, upon investigation, to have received seven cars in that period. A practice commonly followed for the purpose of avoiding payment of demurrage is the repeated reconsignment of cars to allied dealers before the expiration of free time.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has suspended until May 29, 1917, a proposed increase in class rates from points of origin on the Maryland, Delaware & Virginia, the Chesapeake & Atlantic, and the Long Island, to western lake ports and Minneapolis via Cleveland, O., and the boats of the Great Lakes Transit Corporation.

PERSONNEL OF COMMISSIONS

James H. Wilson, a member of the Iowa State Board of Railroad Commissioners, died at Washington, D. C., November 22, at the age of 70.

Joseph S. Gray, a member of the Georgia State Railroad Commission, has resigned that place to become general manager of the Ocilla Southern Railway; and the governor has appointed in his place John P. Boifeuillet, hitherto clerk of the lower house of the Georgia Legislature.

STATE COMMISSIONS

The Massachusetts Public Service Commission, following its investigation of the recent street car disaster at Boston, when 45 persons were drowned, has issued an order requiring street cars always to be brought to a stop before being run over a drawbridge, and also requiring the maintenance of gates to stop cars a reasonable braking distance from each draw. The gates must be painted with alternate black and white diagonal stripes and must be lighted at night; and there must also be a suitable sign, all to be approved by the commission. Further, the gates must be interlocked with the bridge machinery so that the bridge cannot be opened until the gates are closed. If in any case the installation of gates is not practicable, the order requires the installation of a "smash signal," suitably interlocked.

The New York State Public Service Commission, Second district, has declared that it is without power to alter the terms of a contract on the back of a commutation ticket, and has dismissed the complaint of Frederick L. Perine, who asked that the New York Central be compelled to accept his commutation ticket between Crestwood and New York as part payment of his fare when he rode between White Plains and New York on an express train, not stopping at Crestwood. The contract signed by the purchaser limits the ticket to trains regularly scheduled to stop at the stations between which it is sold. Inasmuch as commutation tickets and the regulations for their limited use form part of the basis of the entire passenger rate structure of a railroad, the commission says that even if it had authority to make an order compelling the company to relax these limits, such an order could only be made as the result of a general investigation into the company's passenger tariffs.

The Louisiana Railroad Commission is confronted with a case similar to the Shreveport rate case, in which the state of Louisiana charged discrimination against interstate shippers by the low rates made by the Texas Railroad Commission. The Louisiana commission has given notice that it has taken up for hearing and consideration an application filed by the Kansas City Southern for permission to advance cotton rates from Louisiana points to New Orleans. The application states that on account of the decision of the Interstate Commerce Commission in the Memphis case, the Louisiana lines have been confronted with the proposition of either advancing the cotton rates to New Orleans or reducing the rates to Memphis, St. Louis and other points. In compliance with the commission's order, the lines have published for interstate application, effective on December 1, cotton rates from Louisiana points to New Orleans showing advances. They do this rather than reduce the rates to Memphis, and they desire the authority of the Louisiana commission to make the same rates effective for intrastate application. The Kansas City Southern letter states that should the road not be authorized to make the advances

desired, there is no question but that the order of the Interstate Commerce Commission will force it to make substantial reductions in its interstate rates, and this would be a benefit to no one, while yet it would materially reduce the carriers' revenues.

COURT NEWS

Twenty-Eight Hour Law

Where the initial carrier of live stock confines the animals for more than 28 hours and then hands them over to a connecting carrier, which, after having the stock in its possession for less than 28 hours, delivers it to a terminal carrier, which unloads it for food, water and rest, the Federal District Court, N. D. Iowa, holds that the intermediate carrier is not liable for a penalty under the 28-hour law by its acceptance of the stock, the offense of the initial carrier having been already completed.—United States v. St. Paul, 234 Fed. 386.

Broad Application of the Hours of Service Law

The United States Circuit Court of Appeals, eighth circuit, in a case against the Denver & Interurban Railway Company, decided October 11, last, holds that the hours-of-service act, unlike the employers' liability act, applies to all employees actually engaged in or connected with the movement of any interstate trains, regardless of whether at the exact time the offense was committed they were so employed. The decision was by Judge Carland, concurred in by Judges Triebel and Van Valkenburgh. The decision affirms that of the district court in Colorado, imposing a fine of \$200 on the road for permitting a telegraph operator at Globeville, Colo., to remain on duty more than nine hours in a twenty-four-hour office.

It appears that only on infrequent occasions, when there is some little disturbance of the train movement, does the operator at Globeville handle orders for interstate trains; and the defendant claims that on the occasion when the alleged offense was committed he was not engaged in interstate commerce, nor had he been at any time during that day. The employers' liability act is limited to employees who are injured "while engaged in interstate business," but the hours-of-service act has no such qualifying clause; it applies to all "actually engaged in or connected with" the movement of interstate trains. This operator was at all times subject to the orders of a despatcher who had control of all the trains on an interstate railway.

No Rebate Allowable for Hauling by Shipper After Delivery Within Plant

The New York Court of Appeals has just handed down its decision reversing the judgment of the Appellate Division in the action by the New York Central against the General Electric Company for freight charges of \$618, the defendant counterclaiming for \$114,880 for switching cars within its plant, in which the Appellate Division gave judgment absolute on the defendant's counterclaim. The facts were undisputed. The defendant switched cars within its plant under an agreement that the service would be compensated by an allowance from the published rates. The validity of that agreement was the point in dispute. In July, 1907, after the amendment of the interstate commerce law permitting a charge to be made by consignees against the carrier for terminal services rendered, the electric company filed its petition with the Interstate Commerce Commission asking for compensation for switching. On June 27, 1908, the commission dismissed the petition (General Electric Co. v. New York Central, 14 I. C. C. 237), holding that the service rendered was not part of the service undertaken by the carrier. Its instrumentalities were characterized as plant facilities. In 1910 the railroad company began its action in the state courts for freight charges and the point was litigated anew. The trial term of the New York Supreme Court came to the same conclusion as the Interstate Commerce Commission and this has now been upheld by the Court of Appeals. The result of the decision is that when a railroad has hauled the cars from the main line and on to tracks within the limits of the consignee's yard it has then made the customary and a reasonable delivery. A further movement of cars to mills and warehouses is no part of the carrier's work of transportation, and no rebate can be made from the published tariff rates therefor. N. Y. C. v. G. E. (November, 1916.)

Railway Officers

Executive, Financial, Legal and Accounting

John F. Finerty, announcement of whose appointment, effective November 1, as assistant general counsel of the Great Northern, with office at St. Paul, Minn., has been made in these columns, was born May 27, 1885, at Chicago, Ill. He graduated from the law department of Northwestern University, Chicago, in 1906, and then entered general law practice for several years. In 1908 he was appointed attorney in the legal department of the New York Central, which connection he held until November 25, 1912, when he became general solicitor for the Great Northern. He now is promoted to be assistant general counsel.

Sanford H. E. Freund, general attorney for the Great Northern, with office at St. Paul, Minn., the announcement of whose appointment as assistant general counsel has been made in these columns, was born June 26, 1880, at New York City. He was educated at Phillips Academy, Andover, Mass., graduating from this institution in 1897, and then entered Harvard University. From 1901 to 1903 he attended the Harvard Law School, receiving a degree as bachelor of law. For several years thereafter he was engaged in the general practice of law at Boston, Mass., being a member of the firm of Saltonstall, Dodge & Carter, trial attorneys for the Boston Elevated. In May, 1910, he was appointed eastern attorney for the Chicago, Rock Island & Pacific, with office at New York City. He held this latter connection until November 25, 1912, when he joined the legal forces of the Great Northern at St. Paul, Minn., as general attorney.

Robert S. Hoxie, the announcement of whose election, effective November 1, as auditor of the St. Louis-San Francisco, with office at St. Louis, Mo., was made recently in these columns,

was born near Cambridge, N. Y., on July 28, 1874. He entered railway service with the Delaware & Hudson in its local office at Cambridge, N. Y., in 1889, and was employed there and at other points along the line as clerk, telegraph operator, cashier and agent until 1894, when he entered Union College at Schenectady, N. Y. He graduated from this institution in 1898, and reentered railway service with the St. Louis-San Francisco in the auditing department at St. Louis, Mo. In May, 1902, he was appointed chief freight

clerk in the accounting department, and in May, 1906, was promoted to assistant auditor of freight accounts. He was made first assistant auditor of freight accounts in full charge of overcharge accounts in September, 1911, and auditor of freight accounts in March, 1913. During his first few years of service with the St. Louis-San Francisco he studied law at Washington University, St. Louis, graduating in 1900.

Operating

E. Crawford has been appointed superintendent of car service of the Canadian Northern on lines east of Port Arthur, Ont.

William T. Heenan, soliciting freight agent of the Lehigh Valley, at New York, has been appointed supervisor of mail traffic, a new position. Mr. Heenan's office is at New York City.

D. Crombie, superintendent of transportation at Toronto, Ont., of the Canadian Northern, has been appointed general superintendent, Ontario division, with headquarters at Toronto; and



R. S. Hoxie

the position of superintendent of transportation of eastern lines has been abolished.

J. A. Jones has been appointed superintendent of telegraph of the Southern Railway, with headquarters at Washington, D. C., vice W. H. Potter, resigned, and A. W. Beauprie has been appointed assistant superintendent of telegraph, with headquarters at Washington, D. C.

S. V. Rowland, trainmaster of the Chicago Great Western, at St. Paul, Minn., has been appointed assistant superintendent, with headquarters at Red Wing, Minn., vice J. M. Baths, resigned to accept service with another company. George G. Rutherford is appointed trainmaster, with headquarters at St. Paul, vice Mr. Rowland.

J. A. Gleason, who has been appointed superintendent of the Clifton Forge division of Chesapeake & Ohio with headquarters at Clifton Forge, Va., as has already been announced in these columns, was born on February 10, 1859, at Portsmouth, Va., and was educated in the common schools at Charlotte, N. C. He began railway work in September, 1875, with the Richmond, York River & Chesapeake, now a part of the Southern Railway. From 1876 to 1882, he was telegraph operator outside of railway service. In the latter part of 1882 he returned to railway work as operator on the Richmond & Danville, and from 1883 to 1887, he served as despatcher on that road. He then went to the Norfolk & Western, as despatcher, remaining in that position until January 1, 1889, when he entered the service of the Chesapeake & Ohio and served as despatcher and chief train despatcher until the latter part of 1890. Mr. Gleason was then out of railway work until 1891, when he returned to the service of the Norfolk & Western and served as despatcher and night chief train despatcher until 1899. He returned to the service of the Chesapeake & Ohio as despatcher in August, 1899, and from the following November served as chief train despatcher until his recent appointment as superintendent of the Clifton Forge division of the same road as above noted.



J. A. Gleason

ern, as despatcher, remaining in that position until January 1, 1889, when he entered the service of the Chesapeake & Ohio and served as despatcher and chief train despatcher until the latter part of 1890. Mr. Gleason was then out of railway work until 1891, when he returned to the service of the Norfolk & Western and served as despatcher and night chief train despatcher until 1899. He returned to the service of the Chesapeake & Ohio as despatcher in August, 1899, and from the following November served as chief train despatcher until his recent appointment as superintendent of the Clifton Forge division of the same road as above noted.

Traffic

Charles E. Kingston, assistant general freight agent of the Pennsylvania Railroad at Philadelphia, Pa., has been appointed special agent of the Philadelphia, Baltimore & Washington, with office at Wilmington, Del.

V. H. Smith, general freight and passenger agent of the Webbers Falls Railroad, at Webbers Falls, Okla., has been appointed freight traffic manager, with office at Okmulgee, Okla., and his former position has been abolished.

W. W. Hall, general agent in the freight department of the Chicago, Milwaukee & St. Paul in New York City, has been appointed division freight and passenger agent at Des Moines, Ia., succeeding C. E. Hilliker, transferred.

W. C. McLaughlin, freight tariff agent of the Baltimore & Ohio Southwestern, and the Cincinnati, Hamilton & Dayton at Cincinnati, O., has been appointed assistant general freight agent, with office at Cleveland, Ohio, succeeding A. J. Anderson, transferred.

T. E. Harris, division freight agent of the Georgia & Florida at Valdosta, Ga., has been appointed general freight and passenger agent, with headquarters at Augusta, succeeding H. C. McFadden, traffic manager, resigned to accept service with another company, and W. D. Cook has been appointed assistant general freight agent, with office at Augusta.

James F. Mead, assistant general freight agent of the Atlantic Coast Line at Savannah, Ga., has been appointed assistant general freight agent, with office at Jacksonville, Fla., and jurisdiction in Florida. W. C. Ragin has been appointed assistant general freight agent, with office at Savannah, Ga., and jurisdiction in Georgia and Alabama; Robert Taylor has been appointed division freight agent, with office at Orlando, Fla.

William C. Glynn, who has been appointed assistant general freight agent of the Pennsylvania Railroad, with headquarters at Philadelphia, Pa., was born at Rouseville, Pa., on October 24, 1872. He entered railroad service on December 15, 1890, as a telegraph operator and agent. Beginning on February 11, 1892, he was joint clerk of the Allegheny Valley and the Western New York & Pennsylvania (now absorbed in the Pennsylvania) at Oil City, Pa., where he remained until April, 1900, when he was promoted to chief rate clerk in the office of the general freight agent of the Western New York & Pennsylvania at Buffalo, N. Y. On August 1, 1900, he was transferred as chief rate clerk to the division freight



W. C. Glynn

agent's office of the Buffalo & Allegheny Valley division of the Pennsylvania, which embraces the roads above named. He was advanced to the general freight agent's office at Philadelphia on June 1, 1906, as chief clerk to chief of tariff bureau, and on July 15, 1908, was promoted to chief clerk to the division freight agents at Pittsburgh. He returned to the general offices at Philadelphia in June, 1911, as chief clerk to the general coal freight agent, and in October, 1912, was promoted to division freight agent at Altoona, Pa. Mr. Glynn was appointed division freight agent at Erie, Pa., on March 1, 1916, which position he held until his promotion on December 1, as assistant general freight agent, with headquarters at Philadelphia, as above noted.

Purchasing

M. E. Towner, the announcement of whose appointment, effective November 1, as purchasing agent of the Western Maryland, with headquarters at Baltimore, Md., was recently made in these columns, was born October 3, 1875, at Bradford, Conn., where he received his early education. He entered railway service on September 1, 1894, with the New York, New Haven & Hartford, in the general auditing department at New Haven, Conn., being transferred to New York City on July 1, 1902, as a clerk in the purchasing department. On May 31, 1907, he was appointed assistant to the vice-president of the Chicago, Rock Island & Pacific at Chicago, Ill., and on July 3, 1908, became purchasing agent of the St. Louis & San



M. E. Towner

Francisco, at St. Louis, Mo. He resigned this latter connection in July, 1910, to assume the presidency of the Southern Railway Supply Company. On May 1, 1914, he was appointed special representative of the Whitman & Barnes Company, with office at St. Louis, Mo.

Engineering and Rolling Stock

W. M. Jacklin, supervisor of roadway at Hornepayne, Ont., of the Canadian Northern, has been appointed inspector of maintenance of way for lines east of Port Arthur, with headquarters at Toronto, Ont.

OBITUARY

George Lincoln Sands, formerly general superintendent of the Atchison, Topeka & Santa Fe, and more lately receiver for the Missouri & North Arkansas, died on November 21, age 73.

Allen E. Morrison, formerly division superintendent of the Chicago, Milwaukee & St. Paul, at Wausau, Wis., who retired from active service about four years ago on account of ill health, died at his home in Chicago, November 20, age 57 years.

John C. Haile, passenger traffic manager of the Central of Georgia at Savannah, Ga., died on November 20 at his home in that city. A portrait of Mr. Haile and a sketch of his railway career were published in the *Railway Age Gazette* of August 11, 1916, page 257.

David McNicoll, who resigned as senior vice-president of the Canadian Pacific in January, 1915, died on November 26 at Guelph, Ontario. He was born in April, 1852, at Arbroath, Scotland, and began railway work in August, 1866, as a clerk in the goods manager's office of the North British Railway in Scotland, and in 1873 went in the same capacity to the Midland Railway in England. The following year he went to Canada and was appointed billing clerk on the Northern Railway of Canada, and from 1874 to 1881 was chief clerk in the general manager's office of the Toronto, Grey & Bruce, now a part of the Canadian Pacific. From 1882 to 1883 he was general freight and passenger agent of the same road, and then

was general passenger agent of the Eastern and Ontario divisions of the Canadian Pacific until 1889, when he became general passenger agent of all lines, rail and steamship, of the Canadian Pacific. He then served as passenger traffic manager until April, 1899, when he was appointed assistant general manager. One year later he was elected second vice-president and general manager, and from December, 1903, until his resignation in January, 1915, was senior vice-president of the same road.

Robert S. Dousman, auditor of traffic of the Lehigh Valley at Philadelphia, Pa., died on November 27 at his home in that city. Mr. Dousman was born in 1860 at Milwaukee, Wis., and began railway work in 1880 in the local freight office of the Chicago, Milwaukee & St. Paul at Milwaukee. He was subsequently transferred to the general office, and served in the various capacities of clerk, general bookkeeper, assistant ticket auditor and assistant general auditor, until April, 1897, when he was appointed freight auditor of the same road. Since May, 1903, he was auditor of traffic of the Lehigh Valley.

P. H. Morrissey, assistant to vice-president of the Chicago, Burlington & Quincy, at Chicago, died at Galesburg, Ill., on November 28. He was born on September 11, 1862, at Bloomington, Ill., and began railway work in 1879 as call boy in the locomotive department of the Chicago & Alton, at Bloomington. He became a brakeman, and in 1890 was chosen vice grand master of the Brotherhood of Railroad Trainmen, which organization he had joined in 1885. He subsequently was promoted to be grand master, which office he retained until January, 1909, when he became president of the American Railroad Employees' and Investors' Association, a short-lived organization. Later he served as arbitrator in a large number of controversies between

railways and employees. In 1910, with Interstate Commerce Commissioner E. E. Clark, he arbitrated the demands of the conductors and trainmen on the New York Central & Hudson River. In June, 1913, he was appointed assistant to the vice-president, in charge of operation, of the Chicago, Burlington & Quincy, which position he held at the time of his death.

Henry Monkhouse, until two years ago president of the Rome Locomotive & Machine Works, Rome, N. Y., died in St. Paul, Minn., on November 9, at the age of about 72 years. Mr. Monkhouse was in railway mechanical department service for many years. He was acting master mechanic of the Chicago, Kansas & Nebraska division of the Chicago, Rock Island & Pacific from October, 1887, to November, 1890, following which, from November, 1890, to June, 1891, he was assistant general master mechanic and assistant general master car builder of the Chicago, Rock Island & Pacific lines west of the Missouri River. From June, 1891, to February 1, 1897, he was assistant superintendent of motive power and equipment of the same road; from February 1, 1897, to April 1, 1900, superintendent of machinery of the Chicago & Alton; and from July, 1900, to September, 1901, superintendent of motive power of the Chicago, Indianapolis & Louisville. In September, 1901, he was appointed general manager of the Compressed Air Company, becoming, later, president of the Rome Locomotive & Machine Works, as noted above.

John M. Daly, who resigned as general superintendent of transportation of the Illinois Central in January, 1915, and who recently has been doing expert work on transportation matters before the Interstate and State Commissions, died at his home at Chicago, Ill., November 23, age 56 years. He was born in June, 1860, at Peoria, Ill., and entered railway service in 1874 as a clerk in the car accountant's office of the Toledo, Peoria & Western. From 1878 to 1883, inclusive, he held clerical positions on the Wabash, St. Louis & Pacific, the Atchison, Topeka & Santa Fe, and the Chicago & North Western. From 1884 to 1887 he was car accountant and then trainmaster on the Chicago, St. Paul & Kansas City, and from 1887 to September, 1892,

he was employed as car accountant on the New York, Chicago & St. Louis and the Illinois Central. From September, 1892, to May, 1899, he was superintendent of transportation on this same road, and from May, 1899, to February, 1901, he held this same position with the Delaware, Lackawanna & Western. After a few months of special service with the Intercolonial Railway of Canada he was appointed general manager of the Cape Breton, and in April, 1902, he again returned to the Illinois Central as superintendent of transportation. From June, 1904, to May, 1910, he was car accountant on this same road, being then reappointed superintendent of transportation. In May, 1912, he was promoted to general superintendent of transportation, which position he resigned in January, 1915.

PORT MOVEMENT AT BUENOS AIRES.—During the first nine months of the present year the movement of cars over the railways at the port of Buenos Aires totaled 259,392 goods vans, carrying 2,372,816 tons of cargo, and 1,584 cattle cars.

NEW TRAFFIC RULER IN FRANCE.—Albert Claveille, formerly Under Secretary for Munitions, has assumed office as Director General of Transports and Importations, with supervisory powers over all matters connected with traffic by rail or water. M. Claveille is subordinate to three ministries—war, marine and public works. It will be his duty to carry out measures taken by these ministries to relieve congestion of land and water traffic and to enforce decrees restricting importations.



D. McNicoll



John M. Daly

Equipment and Supplies

LOCOMOTIVES

LIGHTSEY BROTHERS, INC., Hampton, S. C., have ordered one Prairie type locomotive from the Baldwin Locomotive Works.

THE BETHLEHEM STEEL COMPANY, Sparrows Point, Md., has ordered 6 six-wheel switching locomotives from the Baldwin Locomotive Works.

THE FRENCH GOVERNMENT is reported as having placed an order for 100 additional small locomotives with the Baldwin Locomotive Works.

THE MARDEZ LUMBER COMPANY, Benford, Tex., has ordered one consolidation locomotive from the Birmingham Rail & Locomotive Company.

ALBERT N. THOMPSON & Co., Memphis, Tenn., have ordered one switching locomotive from the Birmingham Rail & Locomotive Company.

THE J. M. HEMPHILL LUMBER COMPANY, Rhodes, Miss., has ordered one geared locomotive from the Birmingham Rail & Locomotive Company.

THE PENNSYLVANIA EQUIPMENT COMPANY, Philadelphia, Pa., is in the market for one 50-ton and 2 60-ton second-hand, six-wheel switching locomotives.

THE NORWEGIAN STATE RAILWAYS and other Norwegian railways have placed an order with the Baldwin Locomotive Works for 22 locomotives of various types.

THE SOUTHERN RAILWAY, reported in the *Railway Age Gazette* of November 3 as being in the market for 12 Mallet, 8 Mountain and 25 Santa Fe type locomotives, has ordered these locomotives from the Baldwin Locomotive Works.

THE MISSOURI, KANSAS & TEXAS, reported in the *Railway Age Gazette* of November 10 as being in the market for 25 Mikado and 10 Pacific type locomotives, has ordered the 10 Pacific locomotives from the American Locomotive Company.

W. R. GRACE & Co., New York, has ordered one four-wheel saddle tank locomotive from the American Locomotive Company. This locomotive will have 11 by 16 in. cylinders, 30½ in. driving wheels and a total weight in working order of 41,000 lb.

THE WABASH, reported in the *Railway Age Gazette* of November 17 as having revived an inquiry for 25 Santa Fe type locomotives, has ordered these locomotives from the American Locomotive Company. These engines will have 29 by 32 in. cylinders, 64 in. driving wheels, a total weight in working order of 380,000 lb. and will be equipped with superheaters.

THE RUSSIAN GOVERNMENT was reported in the *Railway Age Gazette* of November 17 as having ordered 40 Decapod locomotives from the American Locomotive Company, 40 from the Baldwin Locomotive Works and 20 from the Canadian Locomotive Company. These locomotives will have 25 by 28 in. cylinders, 52 in. driving wheels, a total weight in working order of 197,000 lb. and will be equipped with superheaters.

THE FLORIDA EAST COAST has ordered 10 Pacific and 2 six-wheel switching locomotives from the American Locomotive Company. The Pacific type locomotives will have 22 by 26 in. cylinders, 68 in. driving wheels and a total weight in working order of 204,000 lb. The six-wheel switching locomotives will have 20 by 26 in. cylinders, 51 in. driving wheels and a total weight in working order of 146,000 lb. All 12 locomotives will be equipped with superheaters.

THE NORFOLK & WESTERN, reported in the *Railway Age Gazette* of September 29 as inquiring for a number of Mountain type locomotives, recently authorized the building of 8 of these locomotives in its own shops. These locomotives will be equipped with superheaters, brick arches and Baker valve gear. Four of them will have Hanna automatic stokers and four street stokers. The Norfolk & Western will also build one heavy Mallet (2-8-8-2) locomotive in its Roanoke shops.

FREIGHT CARS

THE VIRGINIAN is inquiring for 50 gondola cars.

THE ILLINOIS STEEL COMPANY is in the market for 8 steel flat cars.

THE WESTMORELAND COAL COMPANY has issued inquiries for 100 50-ton hopper cars.

THE WABASH is inquiring for specialties for repairing about 750 cars in its own shops.

THE JACOB DOLD PACKING COMPANY will soon place an order for 50 30-ton refrigerator cars.

THE ST. LOUIS SOUTHWESTERN will purchase specialties for repairing about 1,000 cars in its own shops.

THE CHESAPEAKE & OHIO has issued inquiries for 51, 57½-ton flat bottom gondola cars and 26, 57½-ton hopper cars.

THE NEW JERSEY ZINC COMPANY is inquiring for 15 hopper cars, 10 general service cars, 3 box cars and 10 gondola cars.

THE CHICAGO, ROCK ISLAND & PACIFIC has issued inquiries for 2,000 40-ton steel underframe, steel superstructure box cars.

THE BETHLEHEM STEEL COMPANY has ordered 30 20,000-lb. capacity special standard gage quarry cars from the Magor Car Company.

THE UNION RAILROAD has ordered 1,250 cars from the Pressed Steel Car Company, and 750 70-ton gondola cars from the Ralston Steel Car Company.

THE NEW YORK CENTRAL has ordered 2,000 70-ton gondola cars from the Standard Steel Car Company, and is still inquiring for 1,000 to 2,000 42-ft. composite gondola cars.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 500 hopper cars from the American Car & Foundry Company, in addition to the 500 box cars mentioned in last week's issue.

THE NORFOLK & WESTERN, reported in the *Railway Age Gazette* of November 10 as in the market for 4,700 freight cars, will soon issue inquiries for 2,000 115,000-lb. hopper, and 1,000 ventilated box cars.

THE SOUTHERN RAILWAY, reported in the *Railway Age Gazette* of November 10 as having ordered among other cars, 1,265 box cars from the Lenoir Car Works, has since increased this to 1,350 steel center sill 30-ton box cars.

THE GREAT NORTHERN has ordered 500 Moore combination refrigerator, ventilator and heater cars from the Refrigerator, Heater & Ventilator Car Company, St. Paul, Minn. These are in addition to 500 refrigerator cars recently ordered from the Haskell & Barker Car Company.

THE OLIVER IRON MINING COMPANY, Duluth, Minn., has ordered 25 to 50 20-yd., 140,000-lb. capacity, automatic air dump cars from the Magor Car Company. These cars will be of the Magor autopneumatic design, having rolled steel wheels and Andrews cast steel side frames. The same company has also ordered 25 70-ton automatic air dump cars from the Orenstein-Arthur Koppel Company.

RUSSIAN GOVERNMENT.—The *Railway Age Gazette* is in receipt of the following communication:

We notice in the November 17 issue of the *Railway Age Gazette*, under the heading of Freight Cars, there is quoted an abstract from the evening edition of the Wall Street Journal of November 14, which states that an order was placed by the Russian Government with The Bettendorf Company for 4,000 cars, etc.

This statement is erroneous. Mr. Newman Erb secured a contract from the Russian Government for 4,000 gondola cars and we have been negotiating with him during the past several months for the manufacture of these cars, but the terms of payment set forth in our proposition, calling for segregation of funds, could not be met, and we therefore finally found it necessary to withdraw our proposition.

We should like very much to have you publish the exact facts concerning this matter in your next issue, and we sincerely hope that you can comply with our request.

THE BETTENDORF COMPANY, J. W. Bettendorf, President.

PASSENGER CARS

J. B. DUKE has ordered a private car from the Pullman Company.

MRS. H. N. FLAGLER has ordered a private car from the Pullman Company.

THE CHICAGO, BURLINGTON & QUINCY is reported in the market for 5 postal cars.

THE FLORIDA EAST COAST is in the market for 5 coaches and 3 combination cars.

THE MISSOURI, KANSAS & TEXAS has ordered 10 baggage cars from the American Car & Foundry Company.

THE NORFOLK & WESTERN, reported in the *Railway Age Gazette* of October 6 as being in the market for an officers' car, has ordered this car from the Pullman Company.

THE WABASH, reported in the *Railway Age Gazette* of October 27 as being in the market for 6 postal cars, has ordered these cars from the American Car & Foundry Company.

IRON AND STEEL

THE NEW YORK CENTRAL is reported in the market for 150,000 tons of rails.

THE CHICAGO & NORTH WESTERN has ordered 3,500 tons of steel from the American Bridge Company.

SIGNALING

EL PASO & NORTHEASTERN.—This road plans, during the coming year, to install automatic block signals on its line near El Paso, 5½ miles.

EL PASO & SOUTHWESTERN.—This company proposes, during 1917, to install automatic block signals on its line between El Paso, Tex., and Lewis Springs, Ariz., 75 miles.

THE PENNSYLVANIA has given the contract to the General Railway Signal Company for the materials for the installation at Bellevue, Pa., of a 64-lever, model 2, unit lever type, electric-interlocking machine, having 52 working levers and 12 spare spaces; and a 64-lever, model 2, unit lever type, electric-interlocking machine, having 49 working levers and 15 spare spaces, at Baden, Pa. These machines will be installed by the railroad company's forces.

THE RICHMOND, FREDERICKSBURG & POTOMAC (operating also the Washington Southern) has awarded a contract to the General Railway Signal Company for the installation of 102 miles of double-track a. c. automatic block signaling from North Acca, Va., to AF Tower, on 20 miles of which, from North Acca to Doswell, the existing d. c. signaling will be replaced. The signals will be model 2-A base-of-mast type, three positions, with 110-volt induction motors, and wireless control circuits. Polyphase relays will be used throughout. The signal transmission line is 6,600-volt, single-phase, 60 cycle. This will finish the automatic signaling of the main line from Washington, D. C., southward to Richmond, Va., 116 miles. At present the manual block system is used.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS recently awarded a contract for the replacement of seven Thomas pneumatic interlockings now in service in the Nashville terminal, with five electro-pneumatic plants, comprising about 275 working levers, the cost of which will be about \$250,000. In these plants the use of color-light signals in lieu of semaphores is contemplated. The work will not be started before next spring, and probably will not be finished before January 1, 1918. Work will commence on or about January 1, 1917, on the installation of a 12-lever electro-mechanical interlocking plant at Bridgeport, Ala., to cost approximately \$15,000. A contract has been awarded for the revision of the electro-mechanical interlocking at Chattanooga, Tenn., known as "NY," at a cost of about \$8,000. Automatic signals, comprising two signals and six switch indicators, to cost about \$5,500, will be installed to protect the Alton Park extension connection on double-track between the "NY" plant, and an electric-interlocking plant now being built at Lewis street at the crossing with the Chattanooga Belt. The last mentioned plant will comprise 35 working levers, and will cost approximately \$25,000. The Union Switch & Signal Company has contracts for all of the aforementioned projects, both those under way and those contemplated.

Supply Trade News

Directors of the Haskell & Barker Car Company have declared an initial quarterly dividend of 75 cents a share.

The Standard Scale & Supply Company, Pittsburgh, Pa., has moved its Philadelphia branch to larger quarters at 523 Arch street.

The Northwest Steel Company, Portland, Ore., has under consideration the erection of a new \$1,000,000 rolling mill, with a capacity of 20,000 tons of steel per month.

Arthur V. Farr, who for the last three years has been advertising manager of the S K F Ball Bearing Company, Hartford, Conn., has accepted the position of sales manager of the Hess Steel Corporation of Baltimore, Md.

The Burdett Oxygen Company, Chicago, Ill., will complete the erection of its Pittsburgh, Pa., plant, at Fortieth street and the Allegheny Valley tracks, on December 1. This will make the eleventh plant to be established by this company in the various industrial centers of the country.

J. Sterling Goddard, for the past 10 years chief engineer for the American Steel Foundries, Chicago, died at his home in Riverside, Ill., on November 23, at the age of 44. He was born on August 15, 1872, at Monroe, Mich. He graduated from the mechanical engineering department of Cornell University in 1894, and took employment at once with the Western Tube Company, Kewanee, Ill., as an assistant mechanical engineer. He held this position until April, 1898, when he entered the engineering department of the Frazer & Chalmers Company. In 1900 he was appointed chief draftsman in the motive power department of the Chicago, Burlington & Quincy at Chicago, and retained this position until 1906, when he was appointed chief engineer of the American Steel Foundries.

R. C. Weller, formerly industrial agent of the Pittsburgh & Lake Erie, the Lake Shore & Western and the Lake Shore & Michigan Southern jointly, and for the past two years managing secretary of the Erie (Pa.) Board of Commerce, has been appointed traffic manager of the Erie Forge Company at Erie, Pa.

The Railway Steel Spring Company has declared a quarterly dividend of 1¼ per cent on the common stock, payable December 30, and also the regular quarterly dividend of 1¾ per cent on the preferred stock, payable December 20. This is the first disbursement on the common shares since March 22, 1913, when 2 per cent was declared.

The Lagonda Manufacturing Company, Springfield, Ohio, announces the opening of a new branch office in the McCormick building, Chicago. J. E. Chubb, formerly with the Griscom-Russell Company, is in charge as district sales manager. The company's business in this territory was formerly in charge of the Chicago Engineer Supply Company.

J. A. & W. Bird & Co., Boston, Mass., distributors of Ripolin Enamel paint, have arranged to have George Price, manager of the New York office, 120 Broadway, handling the metropolitan district for the past eight years, and who recently completed a trip through the south, engineer and handle the sales department covering the entire territory south of New York, as far west as the Mississippi, and also including Louisiana and Texas.



J. S. Goddard

Westinghouse Electric Grants Employees a Bonus

Announcement has been made by the Westinghouse Electric & Manufacturing Company of an extension of its present bonus system to include salaried and office employees on hourly rates, by which they will receive a bonus of 8 per cent of their salary each month providing their total excusable time absent and late during the month does not exceed six hours incurred on not over three occasions.

An additional 4 per cent will be given each month to the employee who has not lost any time from work during the month through absence or tardiness, thus enabling those affected to obtain an increase in earnings of 12 per cent for a 100 per cent attendance. Several thousand employees in the Pittsburgh district are benefited by the granting of the bonus.

E. E. Hudson

E. E. Hudson, who has for years been prominently identified with the development and installation of the primary battery, will on January 1, 1917, become vice-president and general manager of the Waterbury Battery Company, with headquarters at Waterbury, Conn.

Mr. Hudson, with the exception of a little over a year's time, has been for 18 years in the sales and managerial departments of concerns manufacturing primary batteries, and during this period has been responsible in a large way for the multiplication of the primary battery business in various industries, but particularly in the railway field. For the past eight years he has been closely associated with Thomas A. Edison.

"Ed," as he is known to a host of friends, began his experience in July, 1898, as chief clerk in the primary battery sales department of the Edison Manufacturing Company. He remained there until June, 1902, when he left to take a position as treasurer of the Peerless Fashion Company, in which his family was financially interested. A few months later that company changed hands, and he went as an accountant in the controller's department of the United States Steel Corporation. In December, 1903, he was made secretary and treasurer of the Battery Supplies Company, Newark, N. J., and in 1905 was made sales-manager of that company. When the Edison company absorbed the Battery Supplies Company in 1908 he was appointed assistant manager of sales in the primary battery department. He became sales manager of that department in February, 1909, and in September, 1913, was also elected fourth vice-president. In October, 1914, in addition to these duties, he was also given charge of the manufacturing, as well as the sales, and in March, 1915, was made division manager in general charge of the entire primary battery business of Thomas A. Edison, Inc.

For the past several years Mr. Hudson has been closely identified in the work of several manufacturing associations that have to do with the annual meetings of railroad bodies. In 1914 he was chairman of the Railway Telephone & Telegraph Appliance Association, and still is a member of the executive committee, and on the arrangements committee for the 1917 meeting. During the present year he was chairman of the Signal Appliance Association, previously having been a director and at various times in charge of specific details in connection with the meetings of that association. He is also a director of the National Appliance Association, which is to the American Railway Engineering Association what the Signal Appliance Association is to the Railway Signal Association.

As vice-president and general manager of the Waterbury Battery Company he will have full charge of the company's business, and it is almost useless to add the prediction that success will be with him from the beginning.



E. E. Hudson

Railway Construction

BALTIMORE & OHIO.—Bids have been received by this company for building a 3-mile line from Bosville, Pa., on the Somerset & Cambria branch, into the Jenners coal region.

BOWDON, RAILWAY.—This company, which operates a line from Bowdon, Ga., northeast to Bowdon Junction, 12 miles, is said to be considering the question of building an extension from Bowdon southwest to Roanoke, Ala., about 30 miles.

BUFFALO & DEPEW (ELECTRIC).—This company plans to build an extension, next year, from Depew, N. Y., southeast to Lancaster. The work is to be carried out by company forces. The company now operates a double track line from Buffalo to Depew, 13.59 miles.

CAMBRIA & INDIANA.—This company, which let a contract to A. L. Anderson & Brothers, Altoona, Pa., early this year, to build an extension from Regan Junction, Pa., to Nant-y-Glo, eight miles, is making surveys for an extension from Nant-y-Glo to Revloc, six miles. (April 7, page 817.)

CANADA & GULF TERMINAL.—This company, which operates a line from Mont Joli, Quebec, to Matane, 36 miles, has projected an extension from Matane to Gaspe Basin, 250 miles.

CANADIAN PACIFIC.—This company now has grading work under way on the Western lines, from Vantage, Sask., southerly on seven miles.

DENVER & EPHRATA.—Incorporated in Pennsylvania, with \$130,000 capital, to build a 4.7-mile line in Lancaster county, Pa. H. S. Dissler, Denver, Pa., is president.

GREAT NORTHERN.—The line from Bynum, Mont., to Pendroy, 8.5 miles, was opened for business on November 20. The present end of track is at a point .40 of a mile beyond Pendroy.

HOUSTON-RICHMOND TRACTION COMPANY.—This company intends to construct an electric line from Houston, Tex., to San Antonio, a distance of 190 miles. Contracts for about 60 miles have already been let, and the work is being pushed forward rapidly. This new line will shorten the distance between these two points approximately 25 miles. Contracts for supplies and equipment will be let some time in February or March, 1917. W. A. Rinehart, president, Carter building, Houston, Tex.; Edward Kennedy, purchasing agent, Houston.

MINNESOTA TRANSFER.—This company, which operates a terminal switching road for the railroads entering St. Paul, Minn., and Minneapolis, during the year 1916, laid 5.18 miles of yard tracks.

MORGANTOWN & WHEELING (ELECTRIC).—This company has given a contract to H. D. Eichelberger, Richmond, Va., it is said, to build an extension from Price station, W. Va., to Blacksville, 7.7 miles.

NORTHERN PACIFIC.—This company has awarded a contract for the construction of about 35 miles of new line to Grant, Smith & Co., Spokane, Wash. The line will be built from a point 12 miles west of Billings, Mont., into the wheat growing area northwest of Laurel, Mont.

NORTHWESTERN PENNSYLVANIA (ELECTRIC).—Construction work has been completed on the new line from Cambridge View, Pa., to Venango, Crawford county, 3.5 miles. The new line replaces about 3 miles of track between Cambridge Springs and Venango which will be abandoned. (June 2, p. 1205.)

OAKLAND, ANTIOCH & EASTERN (ELECTRIC).—This company has completed work on an extension from Stow, Cal., to Diablo, 1.36 miles.

OHIO ELECTRIC.—This company, which operates electric lines in Ohio and Indiana, completed work during 1916 on the reconstruction of about ten miles of main track.

PIEDMONT & NORTHERN (ELECTRIC).—This company, which completed an extension from Belmont Junction, N. C., to Belmont 3.1 miles early this year, has survey made for an exten-

sion from Gastonia, N. C., to Kings Mountain. This is a section of the line to be built to complete the gap between Gastonia, N. C., and Spartanburg, S. C. (June 2, page 1205.)

SALT LAKE, GARFIELD & WESTERN.—This company, until recently the Salt Lake & Los Angeles, intends shortly to extend its line to Garfield, Utah, and then electrify its entire system. No engineering or construction work has as yet been done nor any contracts let. However, orders have been placed for rails, ties, poles and other equipment necessary to electrification. It is expected to effect the complete change from steam power to electrification about July, 1917. Joel Richards, secretary and traffic manager, Salt Lake City, Utah.

SALT LAKE & UTAH (ELECTRIC).—This company has completed work on the extension from Spanish Fork, Utah, to Payson, 7.4 miles. The company now operates a total of 66.6 miles. This company also laid 1.5 miles of second track during 1916 between Provo City, Utah, and Provo Junction.

SOUTHWEST MISSOURI (ELECTRIC).—This company will soon construct an extension from Galena, Kan., to Baxter Springs, a distance of 15 miles. No contracts have as yet been awarded. E. J. Pratt, Webb City, Mo., superintendent.

TIDEWATER SOUTHERN.—This company, operating 33 miles of steam road, intends shortly to construct 17 miles additional, and then electrify the entire line. The new construction will be done by the company's own forces. The actual work will commence about January 1. Byron A. Bearce, president and general manager, 25 Sutter street, Stockton, Cal.

VIRGINIA RAILWAY & POWER COMPANY.—According to press reports T. S. Wheelwright, president of this company, is interested in a project to build a line from Richmond, Va., west to Bon Air, seven miles.

RAILWAY STRUCTURES

ARDMORE, OKLA.—The Atchison, Topeka & Santa Fe and the Chicago, Rock Island & Pacific have awarded a contract to the H. D. McCoy Company, Cleburne, Tex., for the construction of a union passenger station. Work will begin at once. The building will cost \$40,000. It will take the place of the one destroyed by fire in September, 1915, following a gasoline explosion.

DANBURY, CONN.—The New York, New Haven & Hartford has given a contract to the T. J. Pardy Construction Company, Bridgeport, Conn., for building enginehouse facilities at Danbury. (Aug. 25, p. 350.)

MEMPHIS, TENN.—It is proposed to build a subway at Lamar avenue, Memphis, at a cost of \$126,000. The cost of the work is to be paid by the city of Memphis and the following railroads: City of Memphis, \$23,000; Nashville, Chattanooga & St. Louis, \$48,000; Union Railway, \$43,000; Memphis Street Railway, \$12,000.

SPENCER, N. C.—The Southern Railway is reported to have given a contract to J. P. Pettyjohn & Co., Lynchburg, Va., to build the new steel car shed and shop at Spencer. (Sept. 29, page 572.)

UTICA, N. Y.—Contracts have been given to H. R. Beebe, Utica, for the substructure, and to the Lackawanna Bridge Company, New York, for the steel superstructure of a footbridge to the enginehouse of the New York Central to be built over Mohawk turnpike, Utica. The bridge will have concrete piers and abutments, steel columns and trusses and timber floor. It will have a clearance of 22 ft. to top of rail, and will be 6 ft. wide and 83 ft. long. The cost of the improvement is about \$30,000.

LOCOMOTIVE PRODUCTION IN GERMANY.—For the year 1916 the Prussian State Railway authorities have ordered 1,600 locomotives, 1,700 passenger vehicles, 400 luggage vans and 38,000 goods wagons, and with a view to executing these requirements every locomotive and railway rolling stock firm in the country has received orders according to their highest capacity for output, but operations are seriously curtailed on account of the shortage of workmen. In several factories prisoners of war, mostly French and Belgians, are working under military supervision. They are mostly skilled laborers who, before taking up arms, were employed in work of a similar kind. In normal times the German locomotive manufacturers can produce in the aggregate about 3,000 locomotives annually.

Railway Financial News

BALTIMORE & OHIO.—Hugh L. Bond, Jr., general counsel, has been elected a director, succeeding Charles S. Harkness, deceased.

CHICAGO GREAT WESTERN.—Application has been made to the railroad commission of Illinois for authority to issue \$2,505,000 first mortgage 50-year 4 per cent bonds.

CHICAGO, ROCK ISLAND & PACIFIC.—The following statement has been given out by the reorganization committee: An informal conference was held November 28 between Frederick W. Scott, Harry Bronner, James A. Patten and Charles G. Dawes and the representatives of the reorganization committee of the Chicago, Rock Island & Pacific. The conference resulted in a completed understanding between the interests represented, and as a result these gentlemen announced their intention of depositing the stock which they own and represent with the reorganization committee under the plan. The reorganization committee has agreed, pursuant to the request of these gentlemen, who represent important stock holdings in the Rock Island, to modify their plan so that the 7 per cent preferred stock given in exchange for new money be callable at 105, and that the 6 per cent preferred stock, payable to the present holders of debentures, be retrievable at 102. The committee representing the debentures of the Chicago, Rock Island & Pacific has given notice to Receiver Dickinson, pursuant to agreement, advising that the committee will upon November 30 request the Bankers' Trust Company's trustees of the debentures to declare the principal due. This is another step in the direction of completing the plan of reorganization.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—This company has declared an extra 3½ per cent dividend on the common stock, in addition to the regular semi-annual dividend of 3 per cent on the common and the regular quarterly 1¼ per cent on the preferred. In May, beside the regular dividends, an extra dividend of 2½ per cent was declared on the common.

IDAHO SOUTHERN.—This road, which runs from Gooding, Idaho, to Jerome, 23 miles, and which has not been in operation since June, is to abandon its line with the permission of the Idaho railroad commission.

NEW YORK CENTRAL.—The Ohio Public Service Commission has been asked to authorize the sale of \$25,000,000 common stock of the New York Central at not less than par.

SALT LAKE & LOS ANGELES.—At a recent meeting of the stockholders of the Salt Lake & Los Angeles the name of the company was changed to Salt Lake, Garfield & Western.

SALT LAKE, GARFIELD & WESTERN.—See Salt Lake & Los Angeles.

SOUTHERN RAILWAY.—Holders of the outstanding general mortgage 4 per cent bonds are asked to deposit their bonds immediately with the Bankers' Trust Company, New York, with October 1, 1917, and subsequent coupons attached, the coupon due April 1, 1917, to be retained by the owner for collection when due, in accordance with the plan described in these columns in the issue of November 3, 1916, page 783. New bonds will be issued in exchange bearing 4½ per cent interest, the first coupon on the new bonds being payable October 1, 1917.

RAILWAY SUBSIDIES IN COLOMBIA.—Colombian law provides for a subsidy of \$16,000 for each mile of roadbed constructed, and grants up to 300 hectares (740 miles) of public land, to be located along the roadbed, for each mile of railway constructed. After 75 years the government reserves the right to purchase the road from the concessionaire.

MOTOR WOMEN ON PARIS RAILWAYS.—Prefect of Police Laurent has issued an order authorizing motor women on the Paris street railways. They will be trained and placed on lines where traffic is lightest. Women are now also replacing baggagemen at some of the railroad stations, notably those of the Paris, Lyons & Mediterranean Railway.

ANNUAL REPORTS

NORTHERN PACIFIC RAILWAY COMPANY—TWENTIETH ANNUAL REPORT

OFFICE OF THE
NORTHERN PACIFIC RAILWAY COMPANY,
ST. PAUL, MINNESOTA.

September 15, 1916.

To the Stockholders of the

NORTHERN PACIFIC RAILWAY COMPANY.

The following, being the Twentieth Annual Report, shows the result of the operation of your property for the fiscal year ending June 30, 1916.

INCOME ACCOUNT.

| | 1915 | 1916 | Increase—I | Decrease—D |
|--------------------------------|-----------------|-----------------|-------------------|------------|
| Railway operating revenues | \$63,171,652.60 | \$75,939,230.65 | I \$12,767,578.05 | |
| Railway operating expenses | 37,108,048.88 | 40,366,411.85 | I 3,258,362.97 | |
| Net revenue | \$26,063,603.72 | \$35,572,818.80 | I \$9,509,215.08 | |
| Railway tax accruals | \$4,470,958.70 | \$5,073,415.42 | I \$602,456.72 | |
| Uncollectible railway revenues | 4,151.33 | 6,213.55 | I 2,062.22 | |
| Total operating income | \$21,588,493.69 | \$30,493,189.83 | I \$8,904,696.14 | |

II—NON-OPERATING INCOME.

| | | | | |
|---|-----------------|-----------------|---|----------------|
| Hire of freight cars—credit balance | \$512,197.20 | \$301,152.76 | D | \$211,044.44 |
| Rent from locomotives and cars | 421,787.31 | 306,156.59 | D | 115,630.72 |
| Joint facility rent income | 1,839,275.32 | 2,019,951.04 | I | 180,675.72 |
| Income from lease of road | 273,352.51 | 287,660.54 | I | 14,308.03 |
| Miscellaneous rent income | 330,970.61 | 319,024.03 | D | 11,946.58 |
| Miscellaneous non-operating physical property—rents | 35,748.88 | 40,142.66 | I | 4,393.78 |
| Separately operated properties—profit | 39,194.81 | 21,283.15 | D | 17,911.66 |
| Dividend income | *6,203,932.00 | *4,345,152.00 | D | 1,858,780.00 |
| Income from funded securities | 235,004.75 | 235,305.50 | I | 300.75 |
| Income from unfunded securities and accounts | 440,713.01 | 473,235.83 | I | 32,522.82 |
| Income from sinking and other reserve funds | 108,245.99 | 124,982.77 | I | 16,736.78 |
| Miscellaneous income | 2,536.94 | 5,211.08 | I | 2,674.14 |
| Total non-operating income | \$10,442,959.33 | \$8,479,257.95 | D | \$1,963,701.38 |
| Gross income | \$32,031,453.02 | \$38,972,447.78 | I | \$6,940,994.76 |

III—DEDUCTIONS FROM GROSS INCOME.

| | | | | |
|------------------------------------|-----------------|-----------------|---|----------------|
| Rent for locomotives and cars | \$118,532.38 | \$123,541.16 | I | \$5,008.78 |
| Joint facility rents | 493,150.80 | \$40,555.58 | I | 47,404.78 |
| Rent for lease of road | 51,331.86 | 51,331.86 | | |
| Miscellaneous rents | 5,752.89 | 5,338.68 | D | 414.21 |
| Miscellaneous tax accruals | | 144.88 | I | 144.88 |
| Interest on funded debt | †12,294,400.16 | †12,303,326.33 | I | 8,926.17 |
| Interest on unfunded debt | 54,380.43 | 25,925.49 | D | 28,454.94 |
| Miscellaneous income charges | 191,084.17 | 192,410.15 | I | 1,325.98 |
| Total deductions from gross income | \$13,208,632.69 | \$13,242,574.13 | I | \$33,941.44 |
| Net income | \$18,822,820.33 | \$25,729,873.65 | I | \$6,907,053.32 |

IV—DISPOSITION OF NET INCOME.

| | | | | |
|--|-----------------|-----------------|---|----------------|
| Dividend appropriation of income | \$17,360,000.00 | \$17,360,000.00 | | |
| Income balance for year—transferred to profit and loss | \$1,462,820.33 | \$8,369,873.65 | I | \$6,907,053.32 |

*Includes dividends on stock of Chicago, Burlington & Quincy R. R. owned by this Company.

†Includes interest paid on this Company's proportion of joint bonds issued by this Company and the Great Northern Railway Company, secured by C. B. & Q. R. R. capital stock as collateral.

MILEAGE OPERATED.

Changes have taken place in the mileage operated during the year as follows:

There were added:

| | Miles |
|---|-------|
| July 1, 1915, Minneapolis, St. Paul & Sault Ste. Marie Ry. in Minnesota, leased | 4.03 |
| July 31, 1915, Fort Simcoe Branch in Washington, extended | 1.34 |

| | |
|---|-------|
| Sept. 1, 1915, Great Northern Railway in Washington, leased.. | 11.73 |
| Oct. 1, 1915, Golden Valley Branch in North Dakota and Montana, constructed | 25.90 |
| June 30, 1916, Fairview Branch, North Dakota, transferred from spur tracks | 1.04 |
| June 30, 1916, Sundry minor changes and corrections..... | .73 |
| Total additions | 44.77 |

| | |
|---|----------|
| Deductions: | |
| June 30, 1916, Tumwater Branch in Washington, shortened.... | 6.10 |
| Net additions | 38.67 |
| Mileage operated June 30, 1915..... | 6,466.17 |
| Mileage operated June 30, 1916..... | 6,504.84 |
| Average mileage operated during the year..... | 6,501.11 |

REVENUE TRAIN MILEAGE.

Revenue passenger train miles during the year were 9,874,845, a decrease of 481,860 miles compared with the previous year.

Revenue freight and mixed train miles during the year were 11,088,936, an increase of 2,076,701 miles.

Revenue special train miles during the year were 14,708, a decrease of 3,914 miles.

All revenue train miles during the year were 20,978,489, an increase of 1,590,927 train miles.

EARNINGS.

FREIGHT BUSINESS.

Freight revenue was \$55,656,395.19, an increase of \$11,822,758.29 or 26.97 per cent compared with the previous year.

7,017,609,074 tons of revenue freight were moved one mile, an increase of 1,853,037,642 tons one mile, or 35.88 per cent more than the previous year.

The average earnings per ton mile decreased from .00849 to .00793.

The revenue train load increased from 573.06 to 632.85 tons. The total train load, including company freight, increased from 668.45 to 717.02 tons.

The number of miles run by revenue freight trains was 10,200,544, an increase of 2,092,984, or 25.82 per cent.

PASSENGER BUSINESS.

Passenger revenue was \$13,852,254.49, an increase of \$233,140.69, or 1.71 per cent compared with the previous year.

Mail revenue was \$1,161,943.23, an increase of \$45,417.84, or 4.07 per cent.

Express revenue was \$1,341,515.80, an increase of \$116,322.92, or 9.49 per cent.

Sleeping car, parlor and chair car, excess baggage and miscellaneous passenger revenue was \$847,116.94, an increase of \$43,636.66, or 5.43 per cent.

Total revenue from persons and property carried on passenger trains was \$17,202,830.46, an increase of \$438,518.11, or 2.62 per cent compared with the previous year.

The number of passengers carried was 8,680,837, a decrease of 75,947 from the previous year, and the number of passengers carried one mile was 616,681,153, an increase of 16,408,000, or 2.73 per cent.

The number of miles run by revenue passenger trains was 9,874,845, a decrease of 481,860, or 4.65 per cent.

The average earnings per passenger per mile was .02246 against .02269 last year.

EARNINGS AND EXPENSES PER MILE OPERATED.

| | 1915 | 1916 |
|---|------------|-------------|
| Operating revenues per mile (average)..... | \$9,777.88 | \$11,680.96 |
| Operating expenses per mile (average)..... | 5,743.68 | 6,209.16 |
| Net operating revenue per mile (average)..... | 4,034.20 | 5,471.80 |
| Taxes per mile (average)..... | 692.03 | 780.39 |

RATIOS.

| | 1915 | 1916 |
|--|--------|--------|
| Operating expenses to operating revenue..... | 58.74% | 53.16% |
| Taxes to operating revenue..... | 7.08% | 6.68% |

OPERATING EXPENSES.

CONDUCTING TRANSPORTATION.

The charges for transportation expenses were \$20,900,054.72, an increase of \$1,912,998.96 or 10.08 per cent, as against an increase in total operating revenue of 20.21 per cent.

MAINTENANCE OF EQUIPMENT.

The charges for maintenance of equipment were \$7,846,259.43, an increase of \$529,185.01 or 7.23 per cent.

LOCOMOTIVES.

Total number of locomotives on active list June 30th, 1915.... 1,361

| | |
|--|---|
| Additions: | |
| Engine acquired with road purchased..... | 1 |
| Engine restored to active list..... | 1 |

1,363

| | |
|---|---|
| Deductions: | |
| Engines sold during the year, from active list..... | 3 |
| Engines dismantled | 4 |

7

Total locomotives on active list June 30, 1916..... 1,356

In addition to the engines on active list there were:

| | |
|---|-----|
| Withdrawn from service and on hand from previous year | 122 |
| Dismantled during year | 82 |
| Restored to active list..... | 1 |
| | 83 |

Leaving on hand engines withdrawn from service which may be sold.....

39

HAULING CAPACITY.

| Active List | Number. | Tractive Power (Pounds.) | Total Weight on Drivers. (Pounds.) | Total Weight of Engines. (Pounds.) |
|---|---------|-----------------------------|--|--|
| Assignment June 30, 1915.... | 1,361 | 45,396,440 | 204,283,688 | 259,848,168 |
| Added during fiscal year, engines reinstated and acquired | 2 | 32,700 | 141,350 | 177,950 |
| Added during fiscal year*..... | | 56,340 | 130,812 | 183,982 |
| Total | 1,363 | 45,372,800 | 204,555,850 | 260,210,100 |
| Engines sold and permanently retired | 7 | 127,600 | 569,850 | 746,100 |
| Assignment June 30, 1916. | 1,356 | 45,245,200 | 203,986,000 | 259,464,000 |

*Account compound engines changed to simple and engines having superheaters applied.

The following statement shows the character and condition of the locomotives of the Company on June 30, 1916.

| Wheel Arrangement. | Owned June 30, 1915. | Sold or Permanently Withdrawn from Service. | Addit. | Owned June 30, 1916. | Average weight of Locomotives without tender. (Tons of 2000 lbs.) | | Average Traction Force Lbs. |
|--------------------|----------------------------|--|--------|----------------------------|---|-------------|--------------------------------------|
| | | | | | Total. | On Drivers. | |
| ○○△ | 1 | ... | ... | 1 | 28.50 | 28.50 | 8,300 |
| ○○○△ | 1 | ... | ... | 1 | 20.25 | 17.00 | 7,900 |
| ○○○△ | 160 | 1 | 1 | 160 | 66.92 | 66.92 | 28,373 |
| ○○○○△ | 14 | ... | ... | 14 | 66.71 | 66.71 | 26,264 |
| ○○○△ | 106 | 2 | ... | 104 | 54.47 | 45.25 | 18,597 |
| ○○○○△ | 118 | ... | ... | 118 | 88.02 | 78.72 | 37,412 |
| ○○○○○△ | 2 | ... | ... | 2 | 78.51 | 65.27 | 34,800 |
| ○○○△ | 63 | 2 | 1 | 62 | 46.58 | 29.76 | 14,313 |
| ○○○○△ | 278 | 2 | ... | 276 | 80.29 | 60.28 | 26,461 |
| ○○○○○△ | 4 | ... | ... | 4 | 93.00 | 75.00 | 38,500 |
| ○○○○△ | 6 | ... | ... | 6 | 84.39 | 45.85 | 21,483 |
| ○○○○○△ | 142 | ... | ... | 142 | 113.47 | 71.42 | 30,891 |
| ○○○○△ | 150 | ... | ... | 150 | 102.25 | 76.75 | 33,300 |
| ○○○○○△ | 270 | ... | ... | 270 | 136.03 | 105.75 | 48,411 |
| ○○○○○○△ | 22 | ... | ... | 22 | 170.70 | 150.72 | 64,936 |
| ○○○○○○○△ | 15 | ... | ... | 15 | 225.80 | 200.73 | 80,500 |
| Total... | 1,361 | 7 | 2 | 1,356 | 95.67 | 75.92 | 33,367 |

| Condition. | 1915. | | 1916. | |
|--|---------|-----------|---------|-----------|
| | Number. | Per Cent. | Number. | Per Cent. |
| Good | 1,095 | 80.46 | 1,121 | 82.67 |
| Fair | 158 | 11.60 | 140 | 10.32 |
| At Shops | 108 | 7.94 | 95 | 7.01 |
| | 1,361 | 100. | 1,356 | 100. |
| Number of oil burning locomotives | 56 | 4.11 | 56 | 4.13 |
| Number of locomotives equipped with superheaters | 261 | 19.18 | 302 | 22.27 |

PASSENGER EQUIPMENT.

On June 30, 1916, the company owned 1,281 passenger train cars, including 128 sleeping cars owned jointly with the Pullman Company, a decrease of 6 cars. The number and kind of cars owned is shown in table on page 38.

Of the 1,281 cars owned 971 were not due in shops for two months or more.

FREIGHT EQUIPMENT.

| Comparative number and capacity of freight cars. | | | Decrease. | | |
|--|------------------------------------|-----------|------------------------------------|--------------|------------------------------------|
| 1915. | | 1916. | | | |
| Number. | Capacity (Tons of 2000 lbs.) | Number. | Capacity (Tons of 2000 lbs.) | Num- ber. | Capacity (Tons of 2000 lbs.) |
| Box | 25,936 | 983,150 | 25,552 | 972,045 | 384 11,105 |
| Furniture and Automobile | 672 | 24,895 | 648 | 24,270 | 24 625 |
| Refrigerator | 4,052 | 129,855 | 4,035 | 129,420 | 17 435 |
| Stock | 2,473 | 57,435 | 2,399 | 55,825 | 74 1,610 |
| Flat | 8,507 | 301,085 | 8,348 | 296,735 | 159 4,350 |
| Oil | 62 | 2,555 | 62 | 2,555 | ... ... |
| Coal | 5,206 | 252,065 | 5,097 | 249,115 | 109 2,950 |
| Ballast and Ore | 1,252 | 54,290 | 1,224 | 53,170 | 28 1,120 |
| Total | 48,160 | 1,805,330 | 47,365 | 1,783,135 | 795 22,195 |
| Percentage ..... | ..... | ..... | ..... | 1.65 | 1.23 |
| Average capacity per car | 37.5 | ..... | 37.6 | ... | .... |

Of the total number of freight cars on the road on June 30, 1916, 1,251 or 2.64% were in need of repairs costing \$5.00 or more per car.

No additional passenger equipment is under contract for construction or is building at company shops. 250 freight cars authorized for construction from second-hand material at company shops.

MAINTENANCE OF WAY AND STRUCTURES.

The charges for Maintenance of Way and Structures were \$8,833,210.00, an increase of \$309,552.55, or 3.63 per cent.

The table in the report of the Comptroller (page 28) shows the distribution of this increase under the respective accounts.

The following statements give particulars of some of the work done and show that the property has been well maintained.

PERMANENT WAY.

| | 1915 | 1916 |
|---|-----------|-----------|
| New main line laid with 90 pound rail.....miles | 46.39 | .... |
| New second track laid with 90 pound rail..... " | 61.56 | .... |
| New branch lines laid with 90 pound rail.... " | 3.82 | .... |
| New branch lines laid with 85 pound rail.... " | 36.87 | 25.90 |
| New branch lines laid with 56, 60 and 70 pound rail | 1.33 | 1.34 |
| Main line relaid with 90 pound rail..... " | 119.88 | 88.05 |
| Main line relaid with 85 pound rail..... " | 9.01 | 0.91 |
| Second track relaid with 90 pound rail..... " | 22.85 | 83.16 |
| Branch lines relaid with 90 pound rail..... " | 1.39 | .48 |
| Branch lines relaid with 56, 66, 72 or 85 pound rail | 79.31 | 74.76 |
| Sidings and spurs constructed..... | 33.69 | 37.80 |
| Track ballasted | 382.97 | 173.70 |
| Embankment widened | 64.73 | 27.51 |
| Cross tie renewals—main line.....ties | 1,956,832 | 1,597,826 |
| Cross tie renewals—branch lines..... " | 1,060,667 | 1,002,622 |
| Timber bridges replaced by permanent structures and embankments | 57 | 25 |
| Equal to | 1.36 | 0.45 |
| Timber bridges renewed | 64 | 106 |
| Timber culverts replaced | 176 | 116 |
| New stock fence constructed.....miles | 126.44 | 101.17 |
| New snow fences constructed..... " | 3.65 | 2.93 |

RAIL IN MAIN, SECOND AND THIRD TRACKS.

| Main Line | Branches | Third Track | Second and Total Miles | |
|-----------------------|----------|-------------|------------------------|----------|
| | | | Miles | Miles |
| 100 pound steel..... | 47.40 | ..... | 47.40 | 47.40 |
| 90 pound steel..... | 1,784.87 | 75.99 | 403.67 | 2,264.53 |
| 85 pound steel..... | 889.29 | 356.43 | 257.97 | 1,503.69 |
| 80 pound steel..... | 1.12 | ..... | 1.10 | 2.22 |
| 76 pound steel..... | ..... | 5.14 | ..... | 5.14 |
| 72 pound steel..... | 83.25 | 1,174.13 | 11.51 | 1,268.89 |
| 70 pound steel..... | ..... | 43.86 | ..... | 43.86 |
| 66 and 67 pound steel | 50.59 | 464.78 | 4.25 | 519.62 |
| 60 pound steel..... | 2.60 | 80.82 | .33 | 83.75 |
| 56 pound steel..... | 2.59 | 1,207.40 | .81 | 1,210.80 |
| Other weights ..... | ..... | 10.90 | ..... | 10.90 |
| TOTAL | 2,861.71 | 3,419.45 | 679.64 | 6,960.80 |
| | | | | 6,938.66 |

BRIDGES.

During the year 132 bridges were replaced, 106 of which, 14,932 feet in length, were replaced by timber structures, and 1 permanent and 25 timber structures in permanent form as follows:

By embankment 19 bridges, 1,523 lineal feet.
By steel truss, girder, I-beam and reinforced concrete trestle 7 bridges, 884 lineal feet.

Total 26 bridges, 2,407 lineal feet.

In addition to changes referred to above 3 temporary bridges were abandoned and 23 temporary structures were added, 116 timber culverts were rebuilt, 14 in temporary and 102 in permanent form.

There are now under construction on operated lines 716 lineal feet of steel girder and I-beam spans for single track, 456 lineal feet of steel trusses for single track, one 140 foot double track steel truss, one 218 foot single track draw span, 394 lineal feet of double track, 126 lineal feet of 4 track and 54 lineal feet of 6 track and 54 lineal feet of 11 track solid floor steel construction of deck type; 128 lineal feet of single track, 66 lineal feet of double track, 157 lineal feet of 4 track, 867 lineal feet of 6 track, 71 lineal feet of 9 track, 71 lineal feet of 10 track and 92 lineal feet of 11 track reinforced concrete trestle and one 68 foot reinforced concrete arch carrying 9 tracks.

BRIDGES AS THEY EXISTED JUNE 30, 1916.

| Description. | No. | Lineal Feet. | Miles. |
|--|-------|--------------|--------|
| Steel, iron, stone and concrete permanent bridges. | 661 | 121,269 | 22.96 |
| Timber and combination iron and timber structures | 2,668 | 421,354 | 79.80 |
| Total | 3,329 | 542,623 | 102.76 |

Total length of timber structures replaced by steel bridges, embankment or other permanent form, from July 1st, 1885, when work was commenced, to June 30th, 1916, has been 132,52 miles.

BUILDINGS AT STATIONS.

New buildings and structures, or increased facilities have been provided at the following stations:

Minnesota: Morgan Park, Cromwell, Aitkin, Deerwood and Becker.

North Dakota: Jamestown, Arena, Soden, Burt and Sweet Briar.

Montana: Willow Creek.

Idaho: Sand Point.

Washington: Pullman.

WATER SUPPLY.

Additional or increased facilities have been provided at the following points:
Montana: Logan and Roberts.
Idaho: Wallace and Arrow.
Washington: Edgecomb.

DOCKS AND WHARVES.

Duluth, Minnesota: conveyor equipment at Docks Nos. 1 and 2.
Seattle, Washington: dredging southerly half of slip between Piers Nos. 5 and 6.
Additional fire protection installed on five piers.
Tacoma, Washington: new offices, London Dock.
Alterations to coal bunker No. 4 to accommodate larger vessels.

CHARGES TO CAPITAL ACCOUNT.

Upon requisition of the Executive Officers, approved by the Board of Directors, expenditures for additions to and betterments of the property have been made during the past fiscal year for:

REAL ESTATE, RIGHT OF WAY AND TERMINALS:

| | |
|--|--------------|
| Superior, Wisconsin, real estate..... | \$780,919.91 |
| St. Paul, Minnesota, real estate..... | 6,025.24 |
| Minneapolis, Minnesota, real estate..... | Cr. 3,829.40 |
| Seattle, Washington, real estate..... | Cr. 7,432.88 |

\$775,682.87

BRANCHES, LINE CHANGES, GRADE REVISION AND SECOND MAIN TRACK:

| | |
|---|---------------|
| Grassy Point Line, Wisconsin-Minnesota (second main track)..... | \$21.86 |
| Cuyuna Northern Branch, Minnesota (extension) | 11,542.26 |
| Golden Valley Branch, North Dakota (construction) | 325,096.11 |
| Flathead Valley Line, Montana (construction) | 3,974.03 |
| Edgecomb to Kruse, Washington (construction) | 23,027.45 |
| Fremont-Ballard Line and draw bridge, Washington (construction) | Cr. 20,737.19 |
| Gray's Harbor & Columbia River Railway, Washington (right of way)..... | 948.43 |
| Gray's Harbor Branch connection at Nisqually and St. Clair, Washington..... | 67,477.89 |
| Lake Union Line Franchise, Washington..... | 36,995.46 |
| Simcoe Branch extension, Washington (construction) | 19,808.94 |
| Spokane, Washington (grade separation).... | 994,393.27 |
| Sunnyside Branch extension, Washington (construction) | 84,231.60 |
| Tenino to Vancouver, Washington (grade revision and double track)..... | Cr. 14,398.75 |
| Point Defiance Line, Tacoma to Tenino, Washington (construction) | 56,268.68 |
| Sundry adjustments | Cr. 6,061.92 |

1,582,588.12

ADDITIONS AND BETTERMENTS:

| | |
|---|------------------|
| Right of way and station grounds (sale of property) | Cr. \$125,542.93 |
| Widening cuts and fills..... | 10,044.48 |
| Protection of banks and drainage..... | 65,610.41 |
| Grade reduction and change of line (adjustments)..... | Cr. 37,358.72 |
| Tunnel improvements..... | 15,439.01 |
| Bridges, trestles and culverts..... | 70,480.68 |
| Increased weight of rail..... | 215,782.67 |
| Improved frogs and switches..... | 15,461.22 |
| Track fastenings and appurtenances..... | 315,871.64 |
| Ballast | 139,918.65 |
| Additional main tracks..... | 774.35 |
| Sidings and spur tracks..... | 59,310.64 |
| Terminal yards | 81,642.43 |
| Fencing right of way..... | 33,932.92 |
| Improvement of crossings—under and over grade | 31,150.04 |
| Elimination of grade crossings..... | Cr. 2,398.97 |
| Interlocking apparatus | 14,826.66 |
| Block and other signal apparatus..... | 3,913.65 |
| Telegraph and telephone lines..... | 38,943.96 |
| Station buildings and fixtures..... | 722,890.24 |
| Shops, enginehouses and turntables..... | 76,934.07 |
| Shop machinery and tools..... | Cr. 3,424.95 |
| Water and fuel stations..... | 2,280.59 |
| Dock and wharf property..... | Cr. 2,666.37 |
| Snow and sand fences and snow sheds..... | 3,196.82 |
| Assessments for public improvements..... | 96,612.02 |
| Paving | 9,503.45 |
| Roadway machinery and tools..... | Cr. 191.22 |
| Coal and ore wharves..... | Cr. 62,776.14 |
| Other additions and betterments..... | 30,356.16 |
| Big Fork & International Falls Ry.—improvements | 3,392.28 |

1,823,909.74

Total

\$4,182,180.73

| NEW EQUIPMENT: | Expenditures | Total Reserves | Charged Capital |
|-----------------------------------|--------------|----------------|-----------------|
| Locomotives | \$91,985.32 | \$28,599.18 | \$63,386.14 |
| Passenger train cars. | 21,138.47 | 14,519.38 | 6,619.09 |
| Freight train and work cars | 180,423.65 | 270,842.33 | Cr. 90,418.68 |
| | | \$293,547.44 | \$313,960.89 |

Balance being equipment abandoned in excess of replacements

20,413.45

Total

\$4,161,767.28

Less
Adjustment of original value of lines abandoned, etc., in previous years in connection with line changes.....

187,899.48

Net charges to capital account for the year.....

\$3,973,867.80

In addition to the foregoing, added to the cost of the Northern Pacific Estate, advances have been made during the year to sundry companies, as follows:

| | |
|---|----------------|
| Midland Railway Company of Manitoba..... | Cr. \$6,793.67 |
| Olympic Peninsular Railway Company..... | 30.50 |
| Kennewick Northern Railway Company..... | 30.50 |
| Bear Creek and Western Railway Company... | 213.27 |
| Missoula & Hamilton Railway Company..... | 453.09 |
| Northern Pacific Terminal Company..... | 44,965.80 |
| Spokane, Portland & Seattle Railway Company | 300,343.40 |

\$339,242.89

RESERVED FOR ACCRUED DEPRECIATION OF EQUIPMENT.

Credit balance, reserve for accrued depreciation July 1, 1915. \$14,113,666.11
Credits during the year ending June 30th, 1916:

| | |
|--|--------------|
| From charges to operating expenses: | |
| Maintenance of equipment, depreciation.. | \$685,276.97 |
| Locomotives | \$194,876.49 |
| Freight cars | 384,983.35 |
| Passenger cars | 91,826.17 |
| Floating equipment | 1,054.24 |
| Work equipment | 12,536.72 |
| Maintenance of equipment, retirements... | 69,105.56 |
| From salvage | 131,381.00 |
| From equipment sold..... | 63,299.32 |

949,062.85

| | |
|-------------------------------|-------------|
| Less equipment retired: | |
| Locomotives | \$28,599.18 |
| Passenger cars | 14,519.38 |
| Freight cars | 216,227.32 |
| Miscellaneous equipment | 54,615.01 |

313,960.89

Credit balance June 30, 1916.....

\$14,748,768.07

CAPITAL STOCK AND DEBT.

There has been no change in the amount of capital stock outstanding during the year, viz.:.....\$248,000,000.00

Changes in bonded debt were as follows:

| | |
|---|--------------|
| Prior Lien Bonds purchased and cancelled under Article eight, Section 2 of Mortgage... | \$530,000.00 |
| St. Paul & Northern Pacific Railway Company mortgage bonds purchased by trustee and cancelled | 27,000.00 |
| Decrease in mortgage debt..... | \$557,000.00 |

NEW LINES, GRADE REVISIONS, LINE CHANGES, ETC.

MINNESOTA.

Cuyuna Northern Railway: To provide facilities for handling ore from the Hillcrest Mine a spur track about 4100 feet long and two sidings are under construction and will be completed this fall.

St. Paul: The New General Office Building was completed, and the various departments moved into their new quarters in December, 1915, and January, 1916.

NORTH DAKOTA AND MONTANA.

Golden Valley Branch: From Beach, North Dakota, southerly to Ollie, Montana, 25.90 miles were completed and turned over for operation October 1, 1915.

MONTANA.

Flathead Branch: Contract has been awarded for grading the Flathead Branch between Dixon and Polson, Montana, a distance of approximately 32.76 miles. It is expected to complete the line next year.

WASHINGTON.

Spokane: The grade separation work has been in progress during the entire year. It is expected that all the work will be completed before the end of the year, except the ballasting, which may have to be laid over until next season. Four bridges under construction east of Spokane under the yard, which are supplementary to the grade separation proper, will not be completed until 1917.

Grandview to Gibbon:

An extension of the Sunnyside Branch from Grandview to Gibbon, Washington, about 12.1 miles, has been authorized and work is in progress. It is expected to complete it this fall.

Harrah to White Swan:

An extension of the Fort Simcoe Branch from Harrah to White Swan, about 10.23 miles, has been authorized and work is in progress. It will be completed early in the fall.

Cowiche Branch:

An extension of the Cowiche Branch, a distance of 1.50 miles, was authorized, and contract was let for the grading. Owing, however, to some right of way complications work has been deferred for this season.

Snoqualmie Falls:

To serve a large saw mill being constructed by the Snoqualmie Falls Lumber Company, a bridge and track approximately 2500 feet long are being built and will be completed this autumn.

Valuation:

The Interstate Commerce Commission having given notice that the property of the Northern Pacific Railway Company would be valued in 1917, commencing in the State of Washington, pursuant to authority the additional force necessary is being employed and the preliminary work is in progress.

GENERAL.

The large increase in freight earnings (\$11,822,758.29) was due to the general prosperity of the country tributary to our lines due to record crops and the consequent money return to the producers in practically all of such territory. The prices received by the growers were better than they have enjoyed for some time, and we handled during the crop year, July 31, 1915, to August 1, 1916, 87,371 cars of grain as compared with 64,039 cars for the previous year, an increase of 23,332 cars. There was also great activity in the mining interests in our country; copper, lead, zinc and iron mines being worked to their full capacity, and the metal selling at high prices created a demand for transportation of not only the products, but of supplies, material, machinery, etc., that swelled our receipts from merchandise to the maximum figures for years.

While the mining and lumber interests are still very active and prosperous, the grain crops for the coming season will not be as satisfactory as for the

year just closed, and it is feared the effect on business of the current year will be quite pronounced.

Further details of the Company's transactions will be found in the attached report of the Comptroller.

The Directors desire to extend to the officers and employees of the Company their thanks for the loyalty to the interests in their care, and their appreciation of the results which have been brought about by the intelligent, conscientious and faithful performance of the duties entrusted to them.

By order of the Board of Directors,

JULE M. HANNAFORD,

President.

IN MEMORIAM.

On the 17th of August, 1916, the Company suffered a great loss in the death of its Chairman, Col. William P. Clough.

Your Executive Committee, at a meeting held on August 30, 1916, expressed its appreciation of Colonel Clough's character and ability, and of the excellence of his official services to the Company, by the unanimous adoption of the following minute, which has been spread upon the permanent records of the Company:

Col. William P. Clough, the Chairman of the Northern Pacific Railway Company, died August 17th, 1916, in New York City, terminating a service of four years as Vice-President and Chairman, and fifteen years as Director and member of the Executive Committee.

During all this period he applied himself unreservedly to the conservation, development and betterment of the Company's properties and interests; and to this task he dedicated with tireless energy the keenness of an analytical mind and the mature judgment resulting from long experience in corporate affairs. The use of his abilities was ever intelligent, loyal and courageous, and was unrestricted by either hours or environment. His devotion to this service was not merely the performance of a duty. It became the all-absorbing inspiration of his life.

His belief in the property's supremacy, in the efficiency and loyalty of its organization, and in the promise of its future, was inspiring; and this belief he at all times jealously defended and justified against all criticism.

His death has deprived the Company of the services of an able counsellor and a capable, conservative and conscientious guardian of its interests; and the Directors record their deep sense of the loss which is sustained by them and by the officers and stockholders of the Company.

To the family of Colonel Clough the Directors extend their heartfelt sympathy, and this testimonial of the high esteem in which he was held by them, both as a man and as an official.

NORTHERN PACIFIC RAILWAY COMPANY.

GENERAL BALANCE SHEET, JUNE 30, 1916.

| ASSETS. | LIABILITIES. |
|--|---|
| INVESTMENTS: | |
| ROAD AND EQUIPMENT (Northern Pacific Estate) June 30, 1915. | |
| Road, lands, etc..... \$416,312,917.95 | |
| Equipment 61,899,930.83 | |
| | <u>\$478,212,848.78</u> |
| Charges since June 30, 1915 (see page 12) 3,973,867.18 | |
| Land Department current assets..... 12,867,715.18 | |
| Less—Land Department net receipts (see page 39) 6,069,636.91 | |
| | <u>\$6,798,078.27</u> |
| Sinking Funds 1,207.07 | |
| Deposits in lieu of mortgaged property (net moneys in hands of Trustees from sale of land grant lands, etc.)..... 3,847,890.07 | |
| Miscellaneous physical property 2,444,973.95 | |
| | <u>\$488,984,794.85</u> |
| INVESTMENTS IN AFFILIATED COMPANIES: | |
| Stocks *\$140,467,141.30 | |
| Bonds 25,430,775.00 | |
| Notes 6,530,182.12 | |
| Advances 1,429,281.75 | |
| | <u>173,857,380.17</u> |
| OTHER INVESTMENTS: | |
| Bonds 25,000.00 | |
| | <u>TOTAL CAPITAL ASSETS..... \$669,161,246.11</u> |
| CURRENT ASSETS: | |
| Cash \$18,305,323.42 | |
| Special deposits (for payment of interest and dividends) 1,831,005.52 | |
| Loans and bills receivable..... 42,533.01 | |
| Traffic and car service balances receivable 1,588,697.08 | |
| Net balance receivable from agents and conductors 796,048.16 | |
| Miscellaneous accounts receivable..... 3,689,878.69 | |
| Material and supplies..... 6,588,836.45 | |
| Interest, dividends and rents receivable. 309,053.20 | |
| | <u>\$33,151,375.53</u> |
| DEFERRED ASSETS: | |
| Working fund advances..... \$31,036.63 | |
| Cash and securities in insurance fund.. 5,803,205.98 | |
| | <u>5,834,242.61</u> |
| UNADJUSTED DEBITS | <u>258,125.15</u> |
| | <u>\$708,404,989.40</u> |
| STOCK: | |
| Capital Stock—Common \$248,000,000.00 | |
| LONG TERM DEBT: | |
| Funded Debt (see page 26)..... \$322,685,000.00 | |
| Less—held in Treasury 9,149,500.00 | |
| | <u>Actually outstanding 313,535,500.00</u> |
| TOTAL CAPITAL LIABILITIES | <u>\$561,535,500.00</u> |
| CURRENT LIABILITIES: | |
| Traffic and car service balances payable \$1,061,908.58 | |
| Audited accounts and wages payable... 9,675,620.52 | |
| Miscellaneous accounts payable..... 520,028.40 | |
| Interest matured unpaid..... 1,873,108.75 | |
| Dividends matured unpaid..... 1,854.50 | |
| Unmatured dividends declared..... 4,340,000.00 | |
| Unmatured interest accrued..... 509,040.83 | |
| Unmatured rents accrued..... 10,397.01 | |
| | <u>\$17,991,958.59</u> |
| DEFERRED LIABILITIES: | |
| Other deferred liabilities..... 180,300.93 | |
| UNADJUSTED CREDITS: | |
| Accrued depreciation of equipment.... \$14,748,768.07 | |
| Other unadjusted credits..... 14,177,694.68 | |
| Insurance and casualty reserves..... 5,803,205.98 | |
| Taxes accrued—partly estimated..... 2,715,069.29 | |
| | <u>37,444,738.02</u> |
| CORPORATE SURPLUS: | |
| Appropriated surplus not specifically invested \$353,754.71 | |
| Profit and loss balance..... 90,898,737.15 | |
| | <u>91,252,491.86</u> |

*Includes this Company's one half of \$107,613,500 stock of the Chicago, Burlington & Quincy Railroad Company to secure \$215,227,000 joint bonds made and issued by this Company and the Great Northern Railway Company to pay for said stock, costing \$109,114,809.76.

PASSENGER AND FREIGHT STATISTICS.

| | 1914-1915 | | 1915-1916 | | Increase 40.44 | Per Cent. | Decrease |
|---|----------------------|-----------------------|----------------------|-----------------------|-------------------|-----------|----------|
| Average mileage for year..... | Miles, Tons, etc. | Amount, Rate, etc. | Miles, Tons, etc. | Amount, Rate, etc. | | | |
| PASSENGER TRAFFIC. | | | | | | | |
| Number of passengers carried..... | 8,756,784 | ..... | 8,680,837 | ..... | ..... | .87 | 75,947 |
| Number of passengers carried one mile... | 600,273,153 | ..... | 616,681,153 | ..... | 16,408,000 | 2.73 | ..... |
| Average miles traveled by each passenger.. | 68.6 | ..... | 71.0 | ..... | 2.4 | 3.50 | ..... |
| Passenger revenue ..... | ..... | \$13,619,113.80 | ..... | \$13,852,254.49 | \$233,140.69 | 1.71 | ..... |
| Other passenger train revenue..... | ..... | 3,145,198.55 | ..... | 3,350,575.97 | 205,377.42 | 6.53 | ..... |
| Total passenger train revenue..... | ..... | 16,764,312.35 | ..... | 17,202,830.46 | 438,518.11 | 2.62 | ..... |
| Average amount paid by each passenger.. | ..... | 1.56 | ..... | 1.60 | .04 | 2.56 | ..... |
| Average rate per passenger per mile..... | ..... | .02269 | ..... | .02246 | ..... | 1.01 | .00023 |
| Passenger train revenue per mile of road (average mileage) ..... | ..... | 2,594.83 | ..... | 2,646.13 | 51.30 | 1.98 | ..... |
| FREIGHT TRAFFIC. | | | | | | | |
| Number of tons revenue freight carried.... | 17,625,225 | ..... | 20,995,693 | ..... | 3,370,468 | 19.12 | ..... |
| Number of tons revenue freight carried one mile | 5,164,571,432 | ..... | 7,017,609,074 | ..... | 1,853,037,642 | 35.88 | ..... |
| Average distance haul of one ton..... | 293.0 | ..... | 334.2 | ..... | 41.2 | 14.06 | ..... |
| Freight revenue ..... | ..... | \$43,833,636.90 | ..... | \$55,656,395.19 | \$11,822,758.29 | 26.97 | ..... |
| Other freight train revenue..... | ..... | 784,147.78 | ..... | 1,075,909.04 | 291,761.26 | 37.21 | ..... |
| Total freight train revenue..... | ..... | 44,617,784.68 | ..... | 56,732,304.23 | 12,114,519.55 | 27.15 | ..... |
| Average receipts from each ton of freight. | ..... | 2.49 | ..... | 2.65 | .16 | 6.43 | ..... |
| Average receipts per ton per mile revenue freight ..... | ..... | .00849 | ..... | .00793 | ..... | 6.60 | .00056 |
| Freight train revenue per mile of road (average mileage) ..... | ..... | 6,906.06 | ..... | 8,726.56 | 1,820.50 | 26.36 | ..... |
| TOTAL TRAIN TRAFFIC. | | | | | | | |
| Revenue from freight and passenger trains. | ..... | \$61,382,097.03 | ..... | \$73,935,134.69 | \$12,553,037.66 | 20.45 | ..... |
| Revenue per mile of road (average mileage) | ..... | 9,500.89 | ..... | 11,372.69 | 1,871.80 | 19.70 | ..... |
| Revenue per train mile..... | ..... | 3.17 | ..... | 3.52 | .35 | 11.04 | ..... |
| Expenses per train mile..... | ..... | 1.92 | ..... | 1.92 | ..... | ..... | ..... |
| Net traffic revenue per train mile..... | ..... | 1.25 | ..... | 1.60 | .35 | 28.00 | ..... |

COLORADO & SOUTHERN RAILWAY COMPANY—SEVENTEENTH ANNUAL REPORT

CHICAGO, July 1, 1916.

To the Stockholders of The Colorado & Southern Railway Company:
Herewith is submitted the Seventeenth Annual Report of your Board of Directors for the year ended June 30, 1916, which report combines the operations and affairs of the lines operated by the companies named on the preceding page and which are herein designated as the

"COLORADO & SOUTHERN LINES."

| Per Cent. | 1916. | OPERATING REVENUES. | 1915. | Per Cent. |
|--------------|-----------------|-----------------------------|-----------------|--------------|
| 72.40 | \$11,371,286.53 | Freight | \$ 9,960,043.59 | 70.28 |
| 21.51 | 3,378,625.65 | Passenger | 3,294,688.32 | 23.25 |
| 1.50 | 235,622.06 | Mail | 234,206.23 | 1.65 |
| 1.38 | 217,175.39 | Express | 230,757.01 | 1.63 |
| 1.95 | 306,016.07 | Miscellaneous | 269,503.51 | 1.90 |
| 1.16 | 182,815.80 | Incidental | 167,621.70 | 1.18 |
| .10 | 15,769.48 | Joint facility | 16,157.47 | .11 |
| 100.00 | \$15,707,310.98 | Total operating revenues... | \$14,172,977.83 | 100.00 |

| OPERATING EXPENSES. | | | | |
|---------------------|-----------------|---------------------------------|-----------------|-------|
| Maintenance | | | | |
| 12.75 | \$ 2,003,135.61 | of way and structures..... | \$ 1,741,313.17 | 12.29 |
| 17.67 | 2,775,182.55 | Maintenance of equipment... | 2,723,291.50 | 19.22 |
| 1.30 | 204,167.66 | Traffic | 215,497.05 | 1.52 |
| 28.29 | 4,443,906.34 | Transportation | 4,908,457.99 | 34.63 |
| .50 | 78,190.69 | Miscellaneous | 81,225.01 | .57 |
| 3.02 | 474,025.81 | General | 441,090.61 | 3.11 |
| 63.53 | \$ 9,978,608.66 | Total operating expenses... | \$10,110,875.33 | 71.34 |
| 36.47 | \$ 5,728,702.32 | Net revenue from operations.. | \$ 4,062,102.50 | 28.66 |
| ..... | \$ 735,781.36 | Railway tax accruals.... | \$ 616,053.40 | ..... |
| ..... | 355.70 | Uncollectible railway revenues. | 483.02 | ..... |
| ..... | \$ 736,137.06 | | \$ 616,536.42 | ..... |
| ..... | \$ 4,992,565.26 | Operating income | \$ 3,445,566.08 | ..... |

| NONOPERATING INCOME. | | | | |
|----------------------|-----------------|------------------------------|-----------------|-------|
| ..... | \$ 521,521.11 | Rents | \$ 482,459.69 | ..... |
| ..... | 75,507.38 | Miscellaneous interest | 172,811.84 | ..... |
| ..... | \$ 597,028.49 | Total nonoperating income... | \$ 655,271.53 | ..... |
| ..... | \$ 5,589,593.75 | Gross income | \$ 4,100,837.61 | ..... |

| DEDUCTIONS FROM GROSS INCOME. | | | | |
|----------------------------------|-----------------|------------------------------|-----------------|-------|
| ..... | \$ 352,873.34 | Rents | \$ 561,126.37 | ..... |
| ..... | 2,868,098.98 | Interest on funded debt... | 2,842,249.47 | ..... |
| ..... | 1,104.00 | Interest on unfunded debt... | 5,631.02 | ..... |
| ..... | 19,349.24 | Amortization of discount | 14,143.27 | ..... |
| ..... | 125,174.18 | on funded debt..... | 62,538.37 | ..... |
| ..... | \$ 3,366,599.74 | Total deductions..... | \$ 3,485,688.50 | ..... |
| ..... | \$ 2,222,994.01 | Net income | \$ 615,149.11 | ..... |

DISPOSITION OF NET INCOME.

| Appropriations for: | |
|-----------------------|----------------------------------|
| \$ 70,298.32 | Sinking funds |
| 170,000.00 | Dividends |
| 280,220.33 | Additions and betterments... |
| 500,000.00 | Miscel. appropriations of income |
| \$ 1,020,518.65 | Total appropriations of income. |
| \$ 1,202,475.36 | Income balance |

Compared with the preceding year, the total operating revenues show an increase of \$1,534,333.15 or 10.82 per cent. The operating expenses show a decrease of \$132,266.67 or 1.31 per cent. The net operating revenue shows an increase of \$1,666,599.82 or 41.03 per cent.

Taxes increased \$119,727.96 over the preceding year, due to increases in assessment by the Federal Government and in tax levies in Colorado, Wyoming, New Mexico and Texas.

Operating income shows an increase of \$1,546,999.18 or 38.08 per cent. The percentage of operating revenues required for operating expenses was 63.53 per cent, as compared with 71.34 per cent. in the previous year.

It required 53.22 per cent. of the gross income to meet interest on funded debt this year, as compared with 72.81 per cent. in the previous year.

During the year the following Long Term Debt obligations have been retired:

First mortgage bonds of the C. S. & C. C. D. Ry. Co. through sinking fund \$ 66,000.00
Deferred rentals under equipment leases 254,000.00

Making net decrease in Long Term Debt of \$320,000.00

There were charges to Capital Account aggregating \$317,859.79 for additions and betterments to property. This amount was expended for:

| | |
|---|--------------|
| Structures and machinery | \$ 21,695.08 |
| Bridges | 111,944.94 |
| Tracks | 43,148.66 |
| Land | 37,131.68 |
| Laying tie plates, main line | 57,242.89 |
| Various other additions and betterments | 46,696.54 |

During the year trackage arrangements were made with the Chicago, Burlington and Quincy R. R. Co. between Wendover and Guernsey, Wyoming, thus making a direct connection with the Colorado and Wyoming Ry. at that point.

The main line between Wendover and Orin Junction, Wyoming, has been taken to the Chicago, Burlington and Quincy R. R. Co., and through joint train service inaugurated between Billings and Denver.

The Denver Union Terminal Railway, which is used by all railroads entering Denver, has been completely remodeled and is now in operation.

A viaduct crossing all tracks south of the Union Terminal, and connecting North and South Denver, is in process of construction and will be completed during the ensuing year.

The operating results of the receiver of The Trinity & Brazos Valley Railway Company show a deficit in the net operating revenue of \$112,215.45, to which there was added for tax and miscellaneous items, \$113,397.11, creating a net income deficit for the year of \$225,612.56.

During the year a number of spur tracks and industry tracks were abandoned, as they were of no further service to the Company, and credits equal to the original cost of the property were passed to the various additions and betterments accounts.

The business of the Company has shown considerable increase during the last fiscal year, making necessary increased expenditures for additional

plant and facilities. In common with the experience of railroads generally throughout the country, there has been an increase in taxes and in some items of expense which may be expected to continue. The Company, by the use of larger power and other improvements in its facilities and the adoption of better methods of operation, has, during the past year, been able to conduct its operations with economy and increased efficiency, but further expenditures for better facilities and additional equipment will continue to be necessary to properly handle the business of the Company, and a

considerable portion of these expenditures should be paid for out of surplus income in order to avoid unnecessary increase in fixed charges and thereby to strengthen the credit of the Company.

Following is the report of the General Auditor, with statements prepared by him.

By order of the Board of Directors.

HALE HOLDEN,
President.

GENERAL BALANCE SHEET:

June 30, 1916.

ASSETS.

INVESTMENTS.

| | |
|---|------------------|
| Investment in road and equipment..... | \$111,272,557.68 |
| Sinking funds | 186.29 |
| Deposits in lieu of mortgage property sold..... | 21,493.65 |
| Miscellaneous physical property..... | 4,660.00 |

Investments in affiliated companies:

| | |
|----------------|---------------|
| Stocks | \$ 448,909.94 |
| Bonds | 8,257,121.29 |
| Notes | 1,943,376.76 |
| Advances | 30,281.77 |

Other investments:

| | |
|----------------|-----------------|
| Stocks | \$ 1,021,610.30 |
| Advances | 417,377.42 |

Total investments \$123,417,575.10

CURRENT ASSETS.

| | |
|--|-----------------|
| Cash | \$ 3,641,771.79 |
| Special deposits | 116,981.96 |
| Loans and bill receivable..... | 7,950.00 |
| Traffic and car service balances receivable..... | 326,070.08 |
| Net balance receivable from agents and conductors..... | 197,959.37 |
| Miscellaneous accounts receivable..... | 454,013.69 |
| Material and supplies..... | 1,231,234.16 |
| Rents receivable | 15,075.46 |
| Other current assets..... | 7,063.47 |

Total current assets \$ 5,998,119.98

DEFERRED ASSETS.

| | |
|----------------------------|-------------|
| Working fund advances..... | \$ 1,468.59 |
| Other deferred assets..... | 8,637.49 |

Total deferred assets..... \$ 10,106.08

UNADJUSTED DEBITS.

| | |
|---|-----------------|
| Rents and insurance premiums paid in advance..... | \$ 20,795.12 |
| Discount on funded debt..... | 280,386.70 |
| Other unadjusted debits..... | 71,527.87 |
| Securities issued or assumed—Unpledged..... | \$ 5,218,446.55 |

Total unadjusted debits..... \$ 372,709.69

Grand Total \$129,798,510.85

INCOME ACCOUNT.

OPERATING INCOME.

Railway operating revenues:

| | |
|-----------------------------|-----------------|
| Transportation: | |
| Freight | \$11,371,286.53 |
| Passenger | 3,378,625.65 |
| Excess baggage | 28,311.07 |
| Mail | 235,622.06 |
| Express | 217,175.39 |
| Other passenger-train | 1,392.56 |
| Switching | 270,991.03 |
| Special service train..... | 4,178.51 |
| Other freight-train | 1,142.90 |

\$15,508,725.70

Incidental:

| | |
|--|--------------|
| Dining and buffet..... | \$ 80,814.90 |
| Hotel and restaurant..... | 1,322.30 |
| Station and train privileges..... | 22,113.89 |
| Parcel room | 1,250.19 |
| Storage—Freight | 3,066.51 |
| Storage—Baggage | 3,859.66 |
| Demurrage | 54,005.66 |
| Rents of buildings and other property..... | 7,770.12 |
| Miscellaneous | 8,612.57 |

182,815.80

Joint facility:

| | |
|--------------------------|--------------|
| Joint facility—Cr. | \$ 15,799.55 |
| Joint facility—Dr. | 30.07 |

15,769.48

Total railway operating revenues..... \$15,707,310.98

Railway operating expenses:

| | |
|--|-----------------|
| Maintenance of way and structures..... | \$ 2,003,135.61 |
| Maintenance of equipment..... | 2,775,182.55 |
| Traffic | 204,167.66 |
| Transportation | 4,443,906.34 |
| Miscellaneous operations | 78,190.69 |
| General | 474,025.81 |

9,978,608.66

| | |
|--|-----------------|
| Net revenue from railway operations..... | \$ 5,728,702.32 |
| Railway tax accruals..... | 735,781.36 |
| Uncollectible railway revenues..... | 355.70 |

736,137.06

Total operating income..... \$ 4,992,565.26

LIABILITIES.

STOCK.

| | |
|-----------------------|------------------|
| Capital stock: | |
| Common stock | \$ 31,021,484.00 |
| Preferred stock | 17,000,000.00 |
| Total stock | \$ 48,021,484.00 |

LONG TERM DEBT.

| | |
|----------------------------|------------------|
| Funded debt unmatured— | |
| Total book liability..... | \$67,793,346.55 |
| Held by carrier..... | 5,218,446.55 |
| Actually outstanding | \$ 62,574,900.00 |

CURRENT LIABILITIES.

| | |
|---|---------------|
| Traffic and car service balances payable..... | \$ 415,330.36 |
| Audited accounts and wages payable..... | 825,280.87 |
| Miscellaneous accounts payable..... | 1,170.63 |
| Interest matured unpaid..... | 109,769.75 |
| Dividends matured unpaid..... | 226.44 |
| Unmatured dividends declared..... | 170,000.00 |
| Unmatured interest accrued..... | 623,873.41 |
| Unmatured rents accrued..... | 9,866.61 |
| Other current liabilities..... | 68,488.50 |

Total current liabilities..... \$ 2,224,006.57

DEFERRED LIABILITIES.

| | |
|---------------------------------|-------------|
| Other deferred liabilities..... | \$ 7,283.68 |
|---------------------------------|-------------|

UNADJUSTED CREDITS.

| | |
|--------------------------------------|---------------|
| Tax liability | \$ 515,783.84 |
| Accrued depreciation—Equipment | 4,730,989.83 |
| Other unadjusted credits..... | 102,928.65 |

Total unadjusted credits..... \$ 5,349,702.32

CORPORATE SURPLUS.

| | |
|--|-----------------|
| Additions to property through income and surplus | \$ 6,488,791.72 |
| Funded debt retired through income and surplus | 468,000.00 |
| Sinking fund reserves..... | 33,397.37 |
| Appropriated surplus not specifically invested | 2,000,000.00 |

| | |
|-------------------------------------|-----------------|
| Total appropriated surplus..... | \$ 8,990,189.09 |
| Profit and loss credit balance..... | 2,630,945.19 |

Total corporate surplus..... \$ 11,621,134.28

Grand Total \$129,798,510.85

NONOPERATING INCOME.

| | |
|---|---------------|
| Hire of equipment | \$ 200,832.68 |
| Joint facility rent income..... | 31,295.60 |
| Income from lease of road..... | 273,006.04 |
| Miscellaneous rent income..... | 16,386.79 |
| Separately operated properties—Profit | 1,943.47 |
| Income from unfunded securities and accounts..... | 73,563.91 |

Gross income \$ 5,589,593.75

DEDUCTIONS FROM GROSS INCOME.

| | |
|---|---------------|
| Hire of equipment | \$ 292,051.05 |
| Joint facility rents | 45,996.42 |
| Miscellaneous rents | 14,825.87 |
| Separately operated properties—Loss | 67,334.65 |
| Interest on funded debt | 2,868,098.98 |
| Interest on unfunded debt | 1,104.00 |
| Amortization of discount on funded debt | 19,349.24 |
| Miscellaneous income charges | 57,839.53 |

Net income \$ 2,222,994.01

DISPOSITION OF NET INCOME.

| | |
|---|--------------|
| Appropriations of income to sinking funds..... | \$ 70,298.32 |
| Dividend appropriations of income: | |
| First preferred stock, 2 per cent., payable Oct. 10, 1916 | 170,000.00 |
| Income appropriated for investment in physical property | 280,220.33 |
| Miscellaneous appropriations of income | 500,000.00 |
| Income balance transferred to Profit and Loss.. | 1,020,518.65 |

Income balance transferred to Profit and Loss.. \$ 1,202,475.36

PROFIT AND LOSS ACCOUNT.

| | |
|--|-----------------|
| Credit balance at beginning of year..... | \$ 1,962,574.18 |
| Credit balance transferred from income..... | 1,202,475.36 |
| Miscellaneous credits | 32,214.05 |
| Dividend appropriations of surplus..... | \$ 263.84 |
| Miscellaneous appropriations of surplus..... | 500,000.00 |
| Loss on retired road and equipment..... | 29,656.59 |
| Miscellaneous debits | 36,397.97 |

Credit balance carried to balance sheet..... \$ 2,630,945.19